

# PATENT ABSTRACTS OF JAPAN

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(11)Publication number : 11-215471

(43)Date of publication of application : 06.08.1999

(51)Int.Cl.

H04N 5/93  
G11B 20/12  
G11B 20/12  
G11B 27/00  
G11B 27/10  
H04N 5/85

(21)Application number : 10-009903

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(22)Date of filing : 21.01.1998

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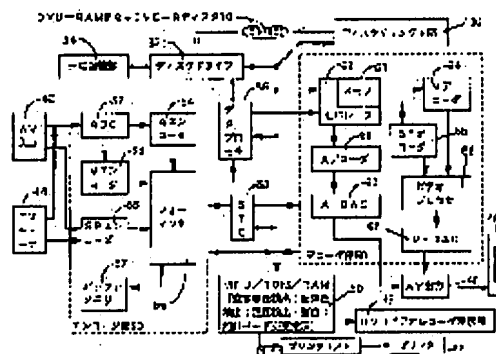
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(54) INFORMATION RECORDING MEDIUM AND PROCESSING UNIT FOR THE SAME

(57)Abstract:

**PROBLEM TO BE SOLVED:** To easily display the contents of a recording medium by providing a 1st data recording area for storing a plurality of image data, corresponding to a plurality of frames and a 2nd data recording area for storing address data denoting a storage location of image data, corresponding to a reduction object frame being an object of reduction display among a plurality of frames.

**SOLUTION:** Required parameters for video data and audio data are set at an encoder section 50, main video data are pre-encoded and the distribution of a code amount which is optimum to a set average transfer rate is calculated. Main video data and audio data are encoded by a series of processings and a value of an average bit rate required for recording is drastically reduced. Similarly, parameters required for encoding sub-video data are set, the encoded sub-video parameters are generated and converted into the structure of a video title-set VTS.



JAPANESE

[JP,11-215471,A]

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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE  
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS  
CORRECTION OR AMENDMENT

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[Translation done.]

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to information record media, such as DVD(digital versatile disc)-RAM (random access memory) which bears record of predetermined information. Moreover, this invention relates to the information record-medium processor which records playback of the information recorded on the information record medium, and information over an information record medium.

**[0002]**

**[Description of the Prior Art]** Now, the system which plays the optical disk which recorded an image (animation), voice, etc. is developed, and like optical disks, such as LD (laser disk) or a video CD (video compact disc), generally it has spread in order to reproduce film software, karaoke, etc. The information which shows the contents of record, such as a title, is usually printed on the front face of these optical disks. Furthermore, the information which shows the contents of record, such as a title, is usually attached to the package of these optical disks. Thereby, even if it does not play an optical disk, the content of record of this optical disk can be known.

**[0003]** Moreover, in recent years, the international-standard-ized MPEG 2 (MUBINGU picture expert group) method was used, and DVD (digital versatile disc) specification which adopted the audio compression method of AC-3 (digital audio compression) and others was proposed. The DVD video only for playbacks (or DVD-ROM), write-once DVD-R, and DVD-R[ in which repetitive R/W is possible ] W (or DVD-RAM) are contained in this DVD specification.

**[0004]** The specification of DVD video (DVD-ROM) is supporting AC3 audio and MPEG audio other than Linear PCM as MPEG 2 and a voice recording method as an animation compression method according to an MPEG 2 system layer. Furthermore, this DVD video specification adds CDC for playback control (navigation data) which carried out run length compression of the bit map data as an object for titles, such as subimage data and a rapid-traverse rewinding data search, and is constituted. Moreover, by this specification, ISO9660 and a UDF bridge format are also supported so that data can be read by computer.

**[0005]** Now, the optical disk (DVD-ROM disk) used for DVD video (DVD-ROM) is a 12cm disk of one layer of one side, and has the storage capacity of about 4.7GB (G cutting tool). There is storage capacity of about 9.5GB in one side two-layer, and about 18GB of mass record is possible double-sided two-layer one (when laser with a wavelength of 650nm is used for reading).

**[0006]** On the other hand, now, the optical disk (DVD-RAM disk) used for DVD-RW (DVD-RAM) is a 12cm disk, has the storage capacity of about 2.6GB (G cutting tool) of one side, and has the capacity of 5.2GB by both sides. The DVD-RAM disk by which current utilization is carried out has storage capacity smaller than the corresponding DVD-ROM disk of size. However, the ED to which the capacity of a DVD-RAM disk is expanded is made continuously, and it is certain that a DVD-RAM disk with the memory capacity of 4.7GB or more of one side will be put in practical use in the near future.

**[0007]** But since the video file of MPEG 2 from which high definition is obtained has large data size, it cannot be said that the present DVD-RAM disk (one side [ 2.6GB of ] disk or double-sided [ 5.2GB of ] disk) is enough as recordable time amount (it being 2.6GB disk and being about 1 hour and 5.2GB disk about 2 hours).

[0008] A user can record data on a DVD-RAM disk freely, and accumulates in it, and the information which shows the content of record is not usually printed on it on the surface of the disk. Since it is the same, the information which shows the content of record is not usually printed on the package of a DVD-RAM disk.

[0009] The following treatment is needed in order to enable it to get to know the content of record of this disk only by glancing at the appearance of a DVD-RAM disk. First, a user grasps the content of record currently recorded on the DVD-RAM disk. Furthermore, a user creates the information which shows the content of record of a DVD-RAM disk. And a user writes in the information which shows the content of record of a DVD-RAM disk on the surface of a disk. Or a user attaches the information which shows the content of record of a DVD-RAM disk to the package of a disk.

[0010]

[Problem(s) to be Solved by the Invention] Since the information about the content of record was not printed on a DVD-RAM disk as described above, there was a problem that the content of record of an optical disk could not be known only by glancing at the appearance of a disk.

[0011] Moreover, in order to have enabled it to get to know the content of record of an optical disk only by glancing at the appearance of a DVD-RAM disk, the user needed to take predetermined measures to the disk.

[0012] The object of this invention is to offer the information record-medium processor which can display the information about the content of record of an information record medium easily, without needing playback and the troublesome time and effort of an information record medium (DVD-RAM disk).

[0013] Moreover, the object of this invention is to offer the information record medium which can be contributed to achievement of the object [ without needing playback and the troublesome time and effort of an information record medium ] of displaying the information about the content of record of an information record medium easily.

[0014]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem and to attain the object, the information record medium and information record-medium processor of this invention are constituted as follows.

[0015] The information record medium of this invention is equipped with the 2nd data storage area which stores the address data in which the storing location of the 1st data storage area which stores two or more image data equivalent to two or more frames, and the image data equivalent to the frame for a cutback set as the object of a reduced display in said two or more frames is shown.

[0016] The information record media of this invention are the 1st data storage area which stores the video data containing two or more image data equivalent to two or more frames, and image data contained in said video data, and are equipped with the 2nd data storage area which stores the address data in which the storing location of the image data equivalent to the frame for a cutback by which a reduced display is carried out to the menu screen used for assignment of the playback starting position of said video data is shown.

[0017] The information record medium of this invention is the video data divided into the 1st and 2nd chapters. The 1st data storage area which stores the video data containing two or more image data equivalent to two or more frames which have the 1st representation frame representing said 1st chapter, and the 2nd representation frame representing said 2nd chapter, It is the image data contained in said video data. It has the 2nd data storage area which stores the address data in which the storing location of the image data equivalent to said 1st and 2nd representation frames by which a reduced display is carried out to the menu screen used when specifying the playback starting position of said video data as said 1st or 2nd chapter is shown.

[0018] The information record medium of this invention is equipped with the 2nd data storage area which stores the address data in which the storing location of the 1st data storage area which stores two or more image data equivalent to two or more frames, and the image data equivalent to the frame for printing set as the object of printing in said two or more frames is shown.

[0019] The information record medium of this invention is equipped with the 2nd data storage area which stores the address data in which the storing location of the Maine image data equivalent to the 1st data storage area which stores the video data containing the Maine image data equivalent to a main

frame and the sub image data equivalent to the subframe following this main frame, and said main frame set as the object of printing is shown.

[0020] The information record medium of this invention is equipped with the 1st data storage area which stores predetermined data, and the 2nd data storage area which stores the appendix data which are appendix data about said predetermined data stored in said 1st data storage area, and are set as the object of printing.

[0021] The information record medium of this invention is equipped with the 1st data storage area which stores predetermined data, and the 2nd data storage area which is capacity data about the capacity of said 1st data storage area, and stores the capacity data set as the object of printing.

[0022] The information record medium of this invention is equipped with the 1st data storage area which stores predetermined data, and the 2nd data storage area which stores the count data of rewriting which are count data of rewriting about the count of rewriting to said 1st data storage area, and are set as the object of printing.

[0023] The 1st data storage area which stores two or more image data by which the information record-medium processor of this invention is equivalent to two or more frames, And it sets to the information record-medium processor which processes the information record medium equipped with the 2nd data storage area which stores the address data in which the storing location of the image data equivalent to the frame for a cutback set as the object of a reduced display in said two or more frames is shown. It has an image formation means to form an image based on the image data stored in the storing location which said address data reproduced by playback means to reproduce the information recorded on said information record medium, and this playback means show.

[0024] The 1st data storage area which stores the video data containing two or more image data by which the information record-medium processor of this invention is equivalent to two or more frames, And it is the image data contained in said video data. In the information record-medium processor which processes the information record medium equipped with the 2nd data storage area which stores the address data in which the storing location of the image data equivalent to the frame for a cutback by which a reduced display is carried out to the menu screen used for assignment of the playback starting position of said video data is shown It has an image formation means to form an image based on the image data stored in the storing location which said address data reproduced by playback means to reproduce the information recorded on said information record medium, and this playback means show.

[0025] The information record-medium processor of this invention is the video data divided into the 1st and 2nd chapters. The 1st data storage area which stores the video data containing two or more image data equivalent to two or more frames which have the 1st representation frame representing said 1st chapter, and the 2nd representation frame representing said 2nd chapter, And it is the image data contained in said video data. When specifying the playback starting position of said video data as said 1st or 2nd chapter In the information record-medium processor which processes the information record medium equipped with the 2nd data storage area which stores the address data in which the storing location of the image data equivalent to said 1st and 2nd representation frames by which a reduced display is carried out to the menu screen boiled and used is shown It has an image formation means to form an image based on the image data stored in the storing location which said address data reproduced by playback means to reproduce the information recorded on said information record medium, and this playback means show.

[0026] The 1st data storage area which stores two or more image data by which the information record-medium processor of this invention is equivalent to two or more frames, And it sets to the information record-medium processor which processes the information record medium equipped with the 2nd data storage area which stores the address data in which the storing location of the image data equivalent to the frame for printing set as the object of printing in said two or more frames is shown. It has an image formation means to form an image based on the image data stored in the storing location which said address data reproduced by playback means to reproduce the information recorded on said information record medium, and this playback means show.

[0027] The Maine image data by which the information record-medium processor of this invention is equivalent to a main frame, And the 1st data storage area which stores the video data containing the sub image data equivalent to the subframe following this main frame, And it sets to the information record-medium processor which processes the information record medium equipped with the 2nd data storage

area which stores the address data in which the storing location of the Maine image data equivalent to said main frame set as the object of printing is shown. It has an image formation means to form an image based on the image data stored in the storing location which said address data reproduced by playback means to reproduce the information recorded on said information record medium, and this playback means show.

[0028] The 1st data storage area where the information record-medium processor of this invention stores predetermined data, And it sets to the information record-medium processor which processes the information record medium equipped with the 2nd data storage area which stores the appendix data which are appendix data about said predetermined data stored in said 1st data storage area, and are set as the object of printing. It has a playback means to reproduce the information recorded on said information record medium, and an image formation means to form an image based on said appendix data reproduced by this playback means.

[0029] The 1st data storage area where the information record-medium processor of this invention stores predetermined data, And it sets to the information record-medium processor which processes the information record medium which is capacity data about the capacity of said 1st data storage area, and was equipped with the 2nd data storage area which stores the capacity data set as the object of printing. It has a playback means to reproduce the information recorded on said information record medium, and an image formation means to form an image based on said capacity data reproduced by this playback means.

[0030] The 1st data storage area where the information record-medium processor of this invention stores predetermined data, And it sets to the information record-medium processor which processes the information record medium equipped with the 2nd data storage area which stores the count data of rewriting which are count data of rewriting about the count of rewriting to said 1st data storage area, and are set as the object of printing. It has a playback means to reproduce the information recorded on said information record medium, and an image formation means to form an image based on said count data of rewriting reproduced by this playback means.

[0031]

[Embodiment of the Invention] Hereafter, with reference to a drawing, the digital information record regeneration system (information record-medium processor) concerning the gestalt of 1 implementation of this invention is explained.

[0032] There is equipment which records and reproduces the animation encoded based on MPEG 2 as a gestalt of typical 1 operation of the digital information record regeneration system concerning this invention with a Variable Bit Rate, for example, a DVD digital video recorder. (About the example of this DVD digital video recorder, it mentions later.)

Drawing 1 is a perspective view explaining the structure of the recordable optical disk 10 used for the above-mentioned DVD digital video recorder.

[0033] As shown in drawing 1, this optical disk 10 has the structure which stuck the transparence substrate 14 of a couple with which the recording layer 17 was formed, respectively by the glue line 20. Each substrate 14 can be constituted from a polycarbonate of 0.6mm thickness, and can constitute a glue line 20 from ultraviolet-rays hardenability resin [ being ultra-thin (for example, 40 micrometer thickness) ]. As a recording layer 17 contacts, when it sticks the 0.6mm substrate 14 of these couples on the field of a glue line 20, the mass optical disk 10 of 1.2mm thickness is obtained.

[0034] The feed hole 22 is established in the optical disk 10, and the clamp area 24 for clamping this optical disk 10 at the time of revolution actuation is established in the perimeter of the feed hole 22 of disk both sides. When the disk drive equipment which is not illustrated is loaded with an optical disk 10, the spindle of a disk motor is inserted in a feed hole 22. And an optical disk 10 is clamped during a disk revolution in the clamp area 24 by the disk clasper which is not illustrated.

[0035] The optical disk 10 has the information area 25 which can record the information on a video data, audio data, and others on the perimeter of the clamp area 24.

[0036] The lead-out area 26 is established in the periphery side among the information area 25. Moreover, the lead-in groove area 27 is established in the inner circumference side which touches the clamp area 24. And the data-logging area 28 is appointed between the lead-out area 26 and the lead-in groove area 27.

[0037] A recording track follows the recording layer (light reflex layer) 17 of the information area 25 for

example, in the shape of a spiral, and is formed in it. The continuation track is divided into two or more physical sectors, and the consecutive number is given to these sectors. Various data are recorded on an optical disk 10 by making this sector into a record unit.

[0038] The data-logging area 28 is a actual data storage area, and audio data, such as subimage data, such as video data (the main image data), such as a film, and a title, a menu, and words, a sound effect, are recorded as record / playback information as same pit train (the physical configuration or phase state which results in an optical change to the laser reflected light).

[0039] The 3 multistory [ as for each recording layer 17 ] between which the optical disk 10 put the phase change record ingredient layer (for example, germanium<sub>2</sub>Sb<sub>2</sub>Te<sub>5</sub>) by one layer of one side with two zinc sulfide and silicon oxide mixture (ZnS-SiO<sub>2</sub>) in the case of the RAM disk of double-sided record can constitute.

[0040] The 3 multistory [ as for the recording layer 17 by the side of the read-out side 19 ] in which an optical disk 10 contains the above-mentioned phase change record ingredient layer in the case of the RAM disk of one layer [ of one side ] one side record can constitute. In this case, the layer 17 which sees from the read-out side 19 and is arranged in an opposite hand does not need to be an information recording layer, and is good in a mere dummy layer.

[0041] When optical disks 10 are two-layer RAM / ROM disk of an one side reading mold, two recording layers 17 can consist of one phase change recording layer (in view of the read-out side 19 back side; for R/W), and one translucent metallic reflective layer (in view of the read-out side 19 near-side; only for playbacks).

[0042] When an optical disk 10 is write-once DVD-R, a polycarbonate is used as a substrate and ultraviolet-rays hardening resin can be used as gold and a protective coat which is not illustrated as reflective film which is not illustrated. In this case, organic coloring matter is used for a recording layer 17. As this organic coloring matter, cyanine, squarylium, a crocodile nick, triphenyl menthonaphthene system coloring matter, a xanthene, quinone system coloring matter (naphthoquinone, anthraquinone, etc.), metal complex system coloring matter (phthalocyanogen, Bolu Phi Lynne, dithiol complex, etc.), and others are available.

[0043] The data writing to such a DVD-R disk can be performed using semiconductor laser with an output of about 6-12mW on the wavelength of 650nm.

[0044] When an optical disk 10 is a two-layer ROM disk of an one side reading mold, two recording layers 17 can consist of one metallic reflective layer (in view of the read-out side 19 back side), and one translucent metallic reflective layer (in view of the read-out side 19 near side).

[0045] In read-only DVD-ROM disk 10, reflecting layers, such as a metal, will be formed in the field of a substrate 14 in which the pit train was beforehand formed in the substrate 14 by the stamper, and this pit train was formed, and this reflecting layer will be used as a recording layer 17. By such DVD-ROM disk 10, especially the groove as a recording track is not prepared, but the pit train formed in the field of a substrate 14 usually functions as a track.

[0046] In various kinds of above-mentioned optical disks 10, the ROM information only for playbacks is recorded on a recording layer 17 as an embossing signal. On the other hand, such an embossing signal is not minced by the substrate 14 with the recording layer 17 for R/W (or for write-once one), instead the groove slot on the continuation is minced. A phase change recording layer is prepared in this groove slot. As for the case of the DVD-RAM disk for R/W, the phase change recording layer of a land part is also further used for information record besides a groove.

[0047] In addition, in an one side reading type (also for one layer or two-layer, a recording layer is) case, an optical disk 10 needs to see from the read-out side 19, and the substrate 14 on a background does not need to have it to the laser for R/W. [ transparent ] In this case, label printing may be carried out all over background substrate 14.

[0048] The DVD digital video recorder mentioned later can be constituted so that the repetitive record and repeated regeneration (R/W) to a DVD-RAM disk (or DVD-RW disk), one the record and repeated regeneration to a DVD-R disk, and the repeated regeneration to a DVD-ROM disk may be possible.

[0049] Drawing 2 is drawing explaining the response relation between the data-logging area 28 of the optical disk (DVD-RAM) 10 of drawing 1, and the recording track of the data recorded there.

[0050] When a disk 10 is DVD-RAM (or DVD-RW), in order to protect a delicate disk side, the body of a disk 10 is contained by the cartridge 11. If the DVD-RAM disk 10 is inserted in the disk drive of the

DVD videocassette recorder mentioned later the whole cartridge 11, it is clamped by the turntable of the spindle motor which a disk 10 is pulled out and illustrated from a cartridge 11, and revolution actuation will be carried out as the optical head which is not illustrated is faced.

[0051] On the other hand, when a disk 10 is DVD-R or DVD-ROM, the body of a disk 10 is not contained by the cartridge 11, but the naked disk 10 comes to be directly set to the disk tray of a disk drive.

[0052] A data-logging track follows the recording layer 17 of the information area 25 shown in drawing 1 in the shape of a spiral, and is formed in it. That continuous track is divided into two or more logical sectors (the minimum record unit) of fixed memory capacity as shown in drawing 2, and data are recorded on the basis of this logical sector. The storage capacity of one logical sector is decided to be the same 2048 bytes (or 2 K bytes) as 1 packed-data length which mentions later.

[0053] It is a actual data storage area and management data, the main image (video) data, subimage data, and voice (audio) data are similarly recorded on the data-logging area 28.

[0054] In addition, although a graphic display is not carried out, the data-logging area 28 of the disk 10 of drawing 2 can be divided into the shape of a ring (the shape of annual rings) in two or more record area (two or more record zones). Although the angular velocity of a disk revolution in every record zone differs, in each zone, linear velocity or angular velocity can be made regularity. In this case, spare record area (free space) can be prepared for every zone. The free spaces for every zone of this can be collected, and it can consider as the reserve area of that disk 10.

[0055] Drawing 3 - drawing 11 are drawings explaining the layered structure of the information recorded on the optical disk 10 of drawing 2.

[0056] The data-logging area 28 formed in the optical disk 10 of drawing 2 has structure as shown in drawing 3. The logical format of this structure is defined based on ISO9660 and the universal disk-formatting (UDF) bridge which are one of the standards.

[0057] From the lead-in groove area 27 before the lead-out area 26 is assigned as a volume space 28. The space for the information on volume and a file structure (volume / file management information 70) and the space for the application of DVD specification (data area DA (rewriting is possible)) are included in this volume space 28.

[0058] A volume space 28 is physically divided into many sectors, and the consecutive number is given to those physical sectors. The logical address of the data recorded on this volume space (data-logging area) 28 means the logical sector number so that it may be set on ISO9660 and a UDF bridge. Logical sector size here is made into 2048 bytes (2 K bytes) like the effective-data size of a physical sector. As for the logical sector number, the consecutive number is added corresponding to the ascending order of a physical sector number.

[0059] In addition, unlike the logical sector, information with redundant error correction information etc. is added to the physical sector. For this reason, if physical sector size is told to accuracy, it is not in agreement with logical sector size.

[0060] That is, the volume space 28 has the layered structure and contains volume / file management information 70, and a data area DA. Moreover, the field included in a volume space 28 is classified on the boundary of a logical sector. Here, 1 logical sector is defined as 2048 bytes, and 1 logical block is also defined as 2048 bytes. Therefore, 1 logical sector is defined as 1 logical block, a pair, etc.

[0061] Volume / file management information 70 is equivalent to the management domain set to ISO9660 and a UDF bridge.

[0062] The information about the outline of an information record medium, the information about record and playback / elimination specification, and the information about manufacture of an information record medium are beforehand recorded on the embossing data area of the lead-in groove area 27. The information about the outline of an information record medium is information, such as disk types (DVD-RAM, DVD-ROM, CD-ROM, etc.) of an optical disk 10, disk size, recording density, and a physical sector number that shows a recording start / record termination location. The information about record and playback / elimination specification is information, such as record power, record pulse width and elimination power, playback power, and linear velocity at the time of record and elimination. The information about manufacture of an information record medium is information, such as a serial number.

[0063] Moreover, the defective management information record section about the proper diskname



record section for identifying an information storage medium, a trial record section (for the check of record elimination conditions), and the defective field in a data area DA is established in the rewritable field of the lead-in groove area 27, and the rewritable field of the lead-out area 26. In each [ these ] field, record by the digital information record regeneration system is attained.

[0064] The data storage area where predetermined data are recorded is established in the data area DA. To this data area DA, mixture record with computer data, and audio data and a video data is possible. In this data area DA, the record sequence of computer data, and an audio data and a video data and each recording information size serve as arbitration. On drawing 3 , the field where computer data are recorded is indicated as computer data areas DA1 and DA3, and the field where an audio video data is recorded is indicated as audio video-data area DA 3.

[0065] Control information DA 21, the video object DA 22, the picture object DA 23, and the audio object DA 24 are recorded on the audio video-data area DA 2. In control information DA 21, when performing each processing of an image transcription (sound recording), playback, edit, and retrieval, it is required control information. It is the image transcription information on the contents of the video data (video data) in the video object DA 22. They are the information for location retrieval that he wants to see in still pictures, such as a slide and a still, and a video data, and the information on the thumbnail for edit in a video data, in the picture object DA 23. It is the sound recording information on the contents of audio data in the audio object DA 24.

[0066] The playback control information DA 211, the record control information DA 212, the edit control information DA 213, and the miniature control information DA 214 are included in control information DA 21. It is the control information which needs the playback control information DA 211 at the time of playback. Record control information DA 212 It is control information required at the time of record (an image transcription and sound recording). It is the control information which needs the edit control information DA 213 at the time of edit. They are the information for location retrieval that he wants to see in a video data, and the management information about the thumbnail for edit in a video data, in the miniature control information DA 214.

[0067] The support pointer DA 2141 and the picture address table DA 2142 are contained in the miniature control information DA 214. Furthermore, the menu index information INFO1, the index picture information INFO2, a slide and the still picture information INFO3, the information picture information INFO4, the defective area information INFO5, and the wallpaper picture information INFO6 are recorded on the picture address table DA 2142.

[0068] Then, with reference to drawing 4 , the information included in the lead-in groove area 27 is explained.

[0069] The data storage area where the capacity information 271 is recorded is established in lead-in groove area. Moreover, the data storage area where the whole capacity information 2711 and the availability information 2712 are recorded is established in the capacity information 271. The full capacity of an optical disk 10 is recorded on the whole capacity information 2711. The availability (residue) of an optical disk 10 is recorded on the availability information 2712. Incidentally, the whole capacity information 2711 and the availability information 2712 are information set as the object of printing. This is explained in detail later. In addition, the layered structure of the lead-in groove area 27 is explained in more detail with reference to drawing 9 - drawing 11 .

[0070] Then, with reference to drawing 5 , the information included in volume / file management information 70 is explained.

[0071] The data storage area where the count information 701 of rewriting is recorded is established in the volume file management information 70. The count of rewriting of the data to a data area DA is recorded on the count information 701 of rewriting. Incidentally, the count information 701 of rewriting is information set as the object of printing. This is explained in detail later.

[0072] Then, with reference to drawing 6 , the information included in the playback control information DA 211 is explained.

[0073] The data storage area where image information INFO7 is recorded is established in the playback control information DA 211. Moreover, image information INFO7 is appendix data about the video data contained in the video object DA 22. The image transcription time information INFO71, the image transcription channel information INFO72, the white balance information INFO73, the zoom scale-factor information INFO74, the shutter speed information INFO75, the GPS information INFO76, etc.

are included in this appendix data. Incidentally, these appendices data are information set as the object of printing. This is explained in detail later.

[0074] Then, with reference to drawing 7, the information included in the menu index information INFO1 is explained.

[0075] The data storage area where the head address data INFO11 and the length data INFO12 are recorded is established in the menu index information INFO1. The head address data INFO11 are data in which the head of the address which shows the storing location of the representation image data equivalent to the representation frame mentioned later is shown. The length data INFO12 are data in which the length from the address which head address data show is shown. That is, it is shown that representation image data is stored between the addresses from the address which the head address data INFO11 show to the length which the length data INFO12 show. Therefore, the storing location of representation image data will be shown by the combination of the head address data INFO11 and the length data INFO12.

[0076] Then, with reference to drawing 8, the information included in control information DA 21 and the video object DA 22 is explained.

[0077] In drawing 8, the video manager VMG consists of multiple-files 74A. The information (the video manager information VMGI, video object set VMGM\_VOBS for video manager menus, video manager information backup file VMGI\_BUP) which manages a video title set (VTS#1-#n) 72 is described by this file 74A.

[0078] The video data compressed into each video title set VTS72 by MPEG specification (video pack mentioned later), It is compressed by predetermined specification. Or incompressible audio data (audio pack mentioned later), With and the subimage data (the subimagery pack mentioned later; 1 pixel contains the bit map data defined by two or more bits) by which run length compression was carried out The information (the navigation pack mentioned later; the presentation control information PCI and the data search information DSI are included) for reproducing these data is stored.

[0079] The video title set VTS72 as well as the video manager VMG consists of multiple-files 74B. This file 74B contains the video title set information VTSM, object set VTSM\_VOBS for video title set menus, video object set VTSTT\_VOBS for video title set titles, and backup VTSM\_BUP of video title set information.

[0080] Here, the number of file 74B which the number of video title sets VTS(VTS#1-#n) 72 is restricted to a maximum of 99 pieces, and constitutes each video title set VTS72 is set to a maximum of 12 pieces. These file 74A and file 74B are the boundaries of a logical sector, and are classified similarly.

[0081] Available information or other information which are not related to a video title set are recordable on other record area 73 by the video title set VTS72 mentioned above. This area 73 may be deleted, if it is not indispensable and is not used.

[0082] Although later mentioned with reference to drawing 14, video object set VTSTT\_VOBS for video title set titles defines the meeting of one or more video objects VOB. Each VOB defines the meeting of one or more cels. And the program chain PGC is constituted by the meeting of one or more cels.

[0083] If one PGC is compared to one drama, if two or more cels which constitute this PGC correspond to a scene various [ in a drama ], they can be interpreted. These contents (or contents of the cel) of PGC are determined by the software provider who makes the content recorded on a disk 10.

[0084] Drawing 9 is drawing explaining the information recorded on the lead-in groove area 27 of an optical disk 10. If set to the DVD videocassette recorder (or DV video player which is not illustrated) which a disk 10 mentions later, the information on the lead-in groove area 27 will be read first. Along with the ascending order of a sector number, a predetermined reference code and predetermined control data are recorded on this lead-in groove area 27.

[0085] The reference code of the lead-in groove area 27 consists of two error correction code blocks (ECC Brock). Each ECC Brock consists of 16 sectors. This two ECC Brock (32 sectors) adds scramble data, and is generated. When the reference code to which scramble data were added is reproduced, he performs filter actuation by the side of playback etc. so that a specific data symbol (for example, 172) may be reproduced, and is trying to secure a subsequent data reading precision.

[0086] The control data of the lead-in groove area 27 consists of ECC Brock of 192. Repeat record of

the content of 16 sectors within each block is carried out 192 times at the part of this control data.

[0087] Drawing 10 shows the content of the control data of the lead-in groove area 27. This control data that consists of 16 sectors includes disk manufacturing information and content provider information in the first 1 sector (2048 bytes) after that including physical format information.

[0088] Drawing 11 shows the content of 2048 bytes of physical format information included in the control data of drawing 10.

[0089] It is indicated by the first byte-position "0" on which version of DVD specification recording information is based.

[0090] The size (12cm, 8cm, in addition to this) and the minimum read-out rate of a record medium (optical disk 10) are indicated by 2nd byte-position "1." In the case of read-only DVD video, as a minimum read-out rate, 2.52Mbps, 5.04Mbps, and 10.08Mbps(es) are specified, but the other minimum read-out rate is also reserved. For example, when an image transcription is performed with the average bit rate of 2Mbps(es) by the DVD videocassette recorder in which Variable Bit Rate record is possible, the minimum read-out rate can be set as 1.5 - 1.8Mbps by using the above-mentioned reserve part.

[0091] The disk structures (type of the number of recording layers, a track pitch, and a recording layer etc.) of a record medium (optical disk 10) are indicated by 3rd byte-position "2." It is discriminable whether it is DVD-ROM, whether that disk 10 is DVD-R, and whether it is DVD-RAM (or DVD-RW) with the type of this recording layer.

[0092] The recording density (a linear consistency and track density) of a record medium (optical disk 10) is indicated by 4th byte-position "3." A linear consistency shows the record length per bit (0.267micrometers [ bit ] /or 0.293micrometers /, such as bit). Moreover, track density shows adjoining track spacing (0.74 micrometers / track, or 0.80 micrometers / track). The reserve part is also prepared in 4th byte-position "3" so that another numeric value can be specified as the linear consistency and track density of DVD-RAM or DVD-R.

[0093] An initiation sector number, a termination sector number, etc. of a data area 28 of a record medium (optical disk 10) are indicated by 5th byte-position "4-15."

[0094] A burst cutting area (BCA) descriptor is indicated by 6th byte-position "16." This BCA is area which is applied only to a DVD-ROM disk as an option and stores the recording information after disk manufacture process termination.

[0095] The availability of a record medium (optical disk 10) is described by 7th byte-position "17-20." For example, when a disk 10 is a DVD-RAM disk of the one layer record of one side, the information which shows 2.6GB (or the number of sectors corresponding to this byte count) is indicated in this location of a disk 10. When a disk 10 is a double-sided record DVD-RAM disk, the information which shows 5.2GB (or the number of sectors corresponding to this byte count) to this location is indicated.

[0096] the 8th byte position -- "21-31 "9th byte-position [ and ] "32-2047" is reserved for the future.

[0097] Drawing 12 has illustrated the directory structure of the information (data file) recorded on an optical disk 10. The subdirectory of a video title set VTS and the subdirectory of the audio title set ATS are connected with the bottom of a root directory like the hierarchical file structure which the general-purpose operating system of a computer has adopted. And in the subdirectory of a video title set VTS, various video files (files, such as VMGI, VMGM, VTSI, VTSM, and VTS) are arranged, and each file is managed tidily. A specific file (for example, specific VTS) is specifying the pass from a root directory to the file, and can be accessed.

[0098] The DVD-RAM (DVD-RW) disk 10 or the DVD-R disk 10 as shown in drawing 1 or drawing 2 is preformatted so that it may have the directory structure of drawing 12, and it can market this preformatted disk 10 as an intact disk for a DVD video image transcription (blank disk).

[0099] That is, the root directory of the preformatted blank disk 10 contains a subdirectory called a video title set (VTS). a management data file (VIDEO\_TS.IFO, VTS\_01\_0.IFO) with this various subdirectory, and; -- the backup file (VIDEO\_TS.BUP, VTS\_01\_0.BUP) which backs up the information on these management data files, and; -- it is managed based on the written content of said management data file, and the video-data file (VTS\_01\_1.VOB) for storing digital animation information can be included.

[0100] The above-mentioned subdirectory can contain further the menu data file (VMGM, VTSM) for storing predetermined menu information.

[0101] Drawing 13 shows the content of the directory record corresponding to the directory structure of

drawing 12 .

[0102] The directory record length is indicated by 1st relative byte-position "0."

[0103] The assigned extended attribute record length is indicated by 2nd relative byte-position "1."

[0104] The number of the first logical sector assigned to an escape is indicated by 3rd relative byte-position "2."

[0105] The data length of a file part is indicated by 4th relative byte-position "10."

[0106] Time when the information in the escape indicated by the directory record is recorded on 5th relative byte-position "18" is indicated. This data of relative byte-position "18" is applicable to record of the image transcription time of an image transcription program (equivalent to specific VTS) in a DVD videocassette recorder.

[0107] The file flag which shows the property of the file specified in the table 10 of ISO9660 is indicated by 6th relative byte-position "25."

[0108] The file unit size assigned to the file part is indicated by 7th relative byte-position "25."

[0109] The size of the interleave gap assigned to the file part is indicated by 8th relative byte-position "27."

[0110] the volume in the volume set on the escape indicated by 9th relative byte-position "28" at the directory record -- consecutive numbers are indicated.

[0111] The die length of the file ID field of a directory record is indicated by 10th relative byte-position "32."

[0112] The directory specified by files ID or ISO9660 is indicated by 11th relative byte-position "33."

[0113] The padding field used as padding in case the die length of a file ID field is even bytes is indicated by the degree of the above-mentioned file ID.

[0114] The copyright management information which a system uses is indicated after the above-mentioned padding field.

[0115] The lead flag (or reproduced flag) which shows whether reading appearance of the recorded specific file (for example, VTS\_01\_1.VOB of drawing 12 ) may be once carried out to the degree of the above-mentioned copyright management information (or is the VTS reproduced even once in the past?) is indicated. The lead flag to the file by which reading appearance is not carried out yet once is set to "0." Once reading appearance is carried out, the lead flag of the file will be set to "1."

[0116] The archive flag (or permanent preservation flag) which shows whether it is the content which wants to preserve the recorded specific file (for example, VTS\_01\_1.VOB of drawing 12 ) permanently at the degree of the above-mentioned lead flag (or is it the content which wants to prevent incorrect elimination or not?) is indicated. The archive flag to the file which may be eliminated is set to "0." The archive flag of a file to save all the time, without erasing is set to "1."

[0117] Drawing 14 shows the layered structure of the information included in video object set VTSTT\_VOBS of drawing 8 .

[0118] As shown in drawing 14 , each cel 84 is constituted by one or more video object units (VOBU) 85. And each video object unit 85 is constituted as the aggregate (pack train) of the video pack (V pack) 88 which makes the navigation pack (NV pack) 86 a head, the subimagery pack (SP pack) 90, and the audio pack (A pack) 91. That is, the video object unit VOB85 is defined as a meeting of all the packs recorded until just before the following navigation pack 86 from a certain navigation pack 86.

[0119] These packs serve as a smallest unit at the time of performing data transfer processing. Moreover, the smallest unit which performs processing on logic is a cel unit, the processing on logic is this cel unit, and it is \*\*\*\*\*.

[0120] The above-mentioned navigation pack 86 is incorporated into the video object unit VOB85 so that any angle-type modification (non seamless playback and seamless playback) can be realized.

[0121] The playback time amount of the above-mentioned video object unit VOB85 is equivalent to the playback time amount of the video data which consists of one or more image groups (omitting [ GRU PUOB picture; ] GOP) contained in the video object unit VOB85, and the playback time amount is defined within the limits of 0.4 seconds - 1.2 seconds. By MPEG specification, 1GOP is usually about 0.5 seconds, and is screen data compressed to reproduce the image of about 15 sheets in the meantime.

[0122] When the video object unit VOB85 contains a video data, GOP (MPEG specification conformity) which consists of a video pack 88, a subimagery pack 90, and an audio pack 91 is arranged,

and a video-data stream is constituted. However, regardless of this number of GOP(s), the video object unit VOB85 is defined on the basis of the playback time amount of GOP, and in that head, as shown in drawing 14, the navigation pack 86 is always arranged.

[0123] In addition, even if it is in the playback data of only an audio and/or subimage data, playback data are constituted by making the video object unit VOB85 into one unit. For example, by making the navigation pack 86 into a head, when the video object unit VOB85 is constituted and it is only in the audio pack 91, the audio pack 91 which should be reproduced like the case where it is the video object VOB83 of a video data, in the playback time amount of the video object unit VOB85 to which the audio data belongs is stored in the video object unit VOB85.

[0124] By the way, in the DVD videocassette recorder which can record the video title set VTS containing VOBS82 of structure as shown in drawing 14 on an optical disk 10, the case where he wants to edit the content of record after this record of VTS arises. Since it replies to this demand, the dummy pack 89 can be suitably inserted into each VOB85. This dummy pack 89 can be used when recording the data for edit later.

[0125] As shown in drawing 14, the video object set (VTSTT\_VOBS) 82 is defined as a set of one or more video objects (VOB) 83. The video object VOB83 under video object set VOBS82 is used for the same application.

[0126] VOBS82 for menus usually consists of one VOB83, and two or more data for a menu screen display are stored there. On the other hand, VOBS82 for a title set usually consists of two or more VOB83.

[0127] Here, VOB83 which constitutes video object set VTSTT\_VOBS82 for a title set can be considered to be equivalent to the image data of a performance of the band if the concert video of a certain rock band is taken for an example. In this case, the 3rd music of the concert program of that band is reproducible by specifying VOB83.

[0128] Moreover, the menu data of the concert program all songs of the band are stored in VOB83 which constitutes video object set VTSM\_VOBS for menus, and it can reproduce to it according to the display of the menu, the specific music, for example, Angkor program.

[0129] In addition, the usual video program can constitute one VOBS82 from one VOB83. In this case, one video stream will be completed by one VOB83.

[0130] On the other hand, on the collection of animation of for example, two or more stories, or the film of an omnibus format, two or more video streams (two or more program chains PGC) can be prepared into one VOBS82 corresponding to each story. In this case, it will be stored in VOB83 to which each video stream corresponds. The audio stream and subimage stream relevant to each video stream are also completed in each VOB83 in that case.

[0131] An identification number (IDN#i; i=0-i) is given to VOB83, and that VOB83 can be specified as it with this identification number. VOB83 consists of 1 or two or more cels 84. Although the usual video stream consists of two or more cels, the video stream for menus may consist of one cel 84. The identification number (C\_IDN#j) is given to each cel 84 like the case of VOB83.

[0132] Reading appearance of drawing 15 was carried out from the optical disk (DVD-ROM or DVD-RAM) 10, and it has illustrated the data stream (pack train) of the packed decimal number acquired in the disk drive which is not illustrated a signal recovery / after an error correction is carried out. This pack train consists of the navigation pack (control pack) 86, the video pack 88, a dummy pack 89, a subimagery pack 90, and an audio pack 91. All of these packs consist of data of a 2-K byte unit like the logical sector of drawing 2.

[0133] The navigation pack 86 contains the pack header 110, the playback control information / presentation control information (PCI) packet 116, and the data retrieval information (DSI) packet 117. The PCI packet 116 consists of a packet header 112 and PCI data 113, and the DSI packet 117 consists of a packet header 114 and DSI data 115. The PCI packet 116 contains the control data which uses the DSI packet 117 at the time of a seamless angle-type change including the control data used at the time of a non seamless angle-type change.

[0134] Here, the above-mentioned angle-type change means changing the include angle (camera angle) which looks at a photographic subject image. If it says in the example of lock concert video, in the performance scene (the same event) of the same music, it means that the scene from various include angles, such as a scene caught to the vocalist subject, a scene caught to the guitarist subject, and a scene

caught to the drummer subject, can be seen.

[0135] In the case where angle-type selection can be performed as a case where an angle-type change (or angle-type modification) is made, according to liking of a viewer, and the flow of a story, automatically, the same scene changes an angle type and may be repeated (when a software maker / provider constitutes a story such and the user of; or the DVD videocassette recorder mentioned later performs such edit).

[0136] Moreover, when selecting an angle type, there are [ \*\*\*\*\* ] the following. In namely, the case of non seamless playback discontinuous on the time amount target of the same scene which returns to beginning and changes an angle type (for example, when the scene by which camera angle changes to another angle type on the scene of the flash when a boxer puts in a counterpunch, and a counter begins to be hammered out again is reproduced) In the case of the seamless playback which changes an angle type on the scene following the scene and which continued in time (for example, the scene toward which the partner who camera angle changed to another angle type at the flash when the boxer put in the counter at and the punch entered, and received the counter is blown away continues in time) It may be reproduced.

[0137] The video pack 88 consists of a pack header 881 and a video packet 882. The dummy pack 89 consists of a pack header 891 and a PATINGU packet 890, and the PATINGU packet 890 consists of a packet header 892 and padding data 893. However, it is put into the invalid data by the padding data 893.

[0138] The subimagery pack 90 consists of a pack header 901 and a subimage packet 902. The audio pack 91 consists of a pack header 911 and an audio packet 912.

[0139] In addition, the decoding time stump (DST) and the presentation time stump (PTS) are recorded on this packet header including the packet header which the video packet 882 of drawing 15 does not illustrate. Moreover, the presentation time stump (PTS) is recorded on those packet headers including the packet header which does not illustrate the subimage packet 902 and the audio packet 912, respectively.

[0140] Drawing 16 shows the structure for navigation pack 1 pack of drawing 15 .

[0141] That is, the navigation pack 86 of one pack consists of 2010 bytes of navigation data containing the system header 111 of 110 or 24 bytes of pack header [ 14 bytes of ], and two packets (116 117). Two packets which constitute this navigation data are the playback control information (PCI) packets 116 and the data search information (DSI) packets 117 which touched by explanation of drawing 15 .

[0142] The PCI packet 116 consists of 6 bytes of packet header 112A, substream identifier [ 1 byte of ] (substream ID) 112B, and 979 bytes of PCI data 113. The data stream of the PCI data 113 is specified by eight bit codes "00000000" of substream ID112B.

[0143] Moreover, the DSI packet 117 consists of 6 bytes of packet header 114A, substream identifier [ 1 byte of ] (substream ID) 114B, and 1017 bytes of DSI data 115. The data stream of the DSI data 115 is specified by eight bit codes "00000001" of substream ID114B.

[0144] Thus, the data length for one pack of the constituted navigation pack 86 becomes 2048 bytes (2 K bytes) equivalent to one logical sector of drawing 2 .

[0145] The pack header 110 and the system header 111 of drawing 16 are defined by the system layer of MPEG 2. That is, the information on a pack initiation code, a system clock reference (SCR), and a multiplexing rate is stored in the pack header 110, and a bit rate and Stream ID are indicated by the system header 111. Similarly, the packet initiation code, the packet size, and Stream ID are stored in packet header 112A of the PCI packet 116, and packet header 114A of the DSI packet 117 as set to the system layer of MPEG 2.

[0146] Drawing 17 shows the structure for dummy pack 1 pack of drawing 15 . That is, the dummy pack 89 of one pack is with the pack header 891, the packet header 892 with the predetermined stream ID, and the padding data 893 fill uped with the predetermined code, and is constituted. (A packet header 892 and the PATINGU data 893 constitute the PATINGU packet 890.) Especially the content of the padding data 893 of an intact dummy pack does not have semantics. This dummy pack 89 can be suitably used, when editing this content of an image transcription after a predetermined image transcription is made by the disk 10 of drawing 2 .

[0147] For example, the case where the video tape which recorded the family travel on videotape is recorded on videotape and edited into the DVD-RAM (or DVD-RW) disk 10 with a portable video

camera is considered.

[0148] In this case, only a video scene to summarize on the disk of one sheet first is selectively recorded on videotape on a disk 10. This video scene is recorded on the video pack 88 of drawing 14. Moreover, the voice simultaneously recorded with the video camera is recorded on the audio pack 91.

[0149] VOBUs containing this video pack 88 surely have the navigation pack 86 in that head. As shown in drawing 15, this navigation pack 86 includes the playback control information PCI and the data retrieval information DSI. The playback procedure of each VOBUs is controllable using this PCI or DSI (for example, a discontinuous scene can be connected automatically or a multi-angle-type scene can be recorded).

[0150] After carrying out an edit image transcription from a video tape at a disk 10, when postrecording voice, a sound effect, etc. per VOBUs on each scene, or when adding background music BGM, postrecording voice or BGM can be recorded dummy pack 89. Moreover, when adding description of the content of an image transcription, subimages, such as an additional alphabetic character and a graphic form, can be recorded on the dummy pack 89. The insertion video can also be recorded dummy pack 89 to insert an additional video image furthermore.

[0151] The postrecording voice mentioned above is written in the padding data 893 of the dummy pack 89 used as an audio pack. Moreover, description of the above-mentioned addition etc. is written in the padding data 893 of the dummy pack 89 used as a subimagery pack. Similarly, the above-mentioned insertion video is written in the padding data 893 of the dummy pack 89 used as a video pack.

[0152] That is, the dummy pack 89 is a pack like a wild card which can therefore also turn into a video pack to an audio pack and a subimagery pack in activity eye.

[0153] Drawing 18 shows the PCI packet 116 contained in the navigation pack 86 arranged at the head of each VOBUs. The PCI packet 116 includes the playback control information (PCI data) PCI 113 which is navigation data for changing the content of a display, or the content of playback (the content of a presentation) synchronizing with the playback condition of the video data in the video object unit (VOBU) 85 so that it may illustrate.

[0154] Drawing 19 shows the content of the playback control information (PCI data) 113 of drawing 18. The PCI data 113 include 60 bytes of PCI general information (PCI\_GI), 36 bytes of angle-type information (NSML\_AGLI) for non seamless playback, 694 bytes of highlights information (HLI), and 189 bytes of recording information (RECI). This recording information (RECI) can contain copyright Control Code (ISRC) of international standards.

[0155] The above-mentioned highlights information HLI can be used in case the following highlights processings are performed. That is, MPU (or CPU) of the DVD videocassette recorder mentioned later reads the highlights information HLI, and detects X / Y coordinate value of the rectangle field (highlights carbon button) displayed by the subimage, a color, a contrast value, etc. According to such detection information, MPU of a DVD videocassette recorder performs highlights processing to the display of a menu selection etc. This highlights processing is used in the user interface on vision as a means which enables it to recognize easily the specific item as which the user was displayed. When the DVD video title recorded by the optical disk 10 on videotape is the program of a multilingual response, specifically, a specific spoken language (for example, English) and the title language (for example, Japanese) of specific language are chosen with the highlights carbon button displayed to be conspicuous on vision with highlights processing.

[0156] Drawing 20 shows the content of playback control information general information PCI\_GI of drawing 19.

[0157] In this playback control information general information PCI\_GI The logical-block number of a navigation pack (NV\_PCK\_LBN), The category of a video object unit (VOBU) (VOBU\_CAT), User actuation control of a video object unit (VOBU) (VOBU\_UOP\_CTL), The display start time of a video object unit (VOBU) (VOBU\_S\_PTM), The display end time (VOBU\_E\_PTM) of a video object unit (VOBU), the display end time (VOBU\_SE\_PTM) of the sequence tail in a video object unit (VOBU), and cel elapsed time (C\_ELTM) are indicated.

[0158] Here, the above-mentioned logical-block number (NV\_PCK\_LBN) shows the address (record location) of the navigation pack with which playback control information (PCI) is included by the relative block count from the logical block of the beginning of the video object set (VOBS) with which the PCI was contained.



[0159] The above-mentioned category (VOBU\_CAT) indicates the content of the copy protection of the analog signal corresponding to the video and the subimage in the video object unit (VOBU) in which playback control information (PCI) is included.

[0160] The above-mentioned user actuation control (VOBU\_UOP\_CTL) indicates the user actuation forbidden during the display (presentation) period of the video object unit (VOBU) in which playback control information (PCI) is included.

[0161] The above-mentioned display start time (VOBU\_S\_PTM) indicates the display (presentation) start time of a video object unit (VOBU) when playback control information (PCI) is included. Speaking more concretely, this VOBUS\_PTM's pointing out the display start time of the first image (the first picture) in the display order of GOP of the beginning in a video object unit (VOBU).

[0162] The above-mentioned display end time (VOBU\_E\_PTM) indicates the display (presentation) end time of the video object unit (VOBU) in which playback control information (PCI) is included. While the video data in a video object unit (VOBU) continuing speaking more concretely, this VOBUE\_PTM points out the display end time of the image (the last picture) of the last in the display order of GOP of the last in a video object unit (VOBU).

[0163] On the other hand, when a video data does not exist in a video object unit (VOBU), or when playback of that video object unit (VOBU) is suspended, this VOBUE\_PTM comes to point out the end time of the imagination video data by which the aryne was carried out to the time amount grid of field spacing (NTSC video 1 / 60 seconds).

[0164] The above-mentioned display end time (VOBU\_SE\_PTM) indicates the display (presentation) end time by the sequence end code of the video data in the video object unit (VOBU) in which playback control information (PCI) is included. Speaking more concretely, pointing out the display end time of the image (the last picture) of the last of the display order in which the sequence end code in a video object unit (VOBU) is contained. When an image with a sequence end code (picture) does not exist in a video object unit (VOBU), 00000000h (h is the mind of HEKISADESHIMARU) enters VOBUSE\_PTM.

[0165] The above-mentioned cel elapsed time (C\_ELTM) describes the relative display (presentation) time amount from the first video frame in the display order of the cel in which playback control information (PCI) is included to the first video frame in the display order of the video object unit (VOBU) in which this PCI is contained with the time amount, the part, second, and frame of a BCD format. When there is no video data into a video object unit (VOBU), said imagination video frame of the beginning of a video data is used as the above-mentioned video frame.

[0166] Drawing 21 shows the content of the video manager VMG of drawing 8. This VMG consists of multiple-files 74A. This video manager VMG includes the video manager information (VMGI) 75, the object set (VMGM\_VOBS) for video manager menus, and backup (VMGI\_BUP) of video manager information corresponding to each file.

[0167] Here, backup VMGI\_BUP of the video manager information VMGI and video manager information can be made into an indispensable item, and video object set VMGM\_VOBS for displaying the video manager information menu VMGM can be made into an option.

[0168] As shown in drawing 21, to the video manager information (VMGI) 75 arranged at the head of the video manager VMG A video manager information management table (VMGI\_MAT; indispensable), A title search pointer table (TT\_SRPT; indispensable), the program chain information unit table of a video manager menu (indispensable, when VMGM\_PGCI\_UT; VMGM\_VOBS exists), A parental management information table (PTL\_MAIT; option), a video title set attribute table (VTS\_ATRT; indispensable), A text data manager (TXTDT\_MG; option), a video manager MENYUSERU address table (indispensable, when VMGM\_C\_ADT; VMGM\_VOBS exists), And the video MANEJAMENYUBIDEO object unit address map (indispensable, when VMGM\_VOBU\_ADMAP; VMGM\_VOBS exists) is described by this sequence.

[0169] In addition, the addresses, such as an ending address (VMGI\_MAT\_EA) of video manager information management table VMGI\_MAT and a start address (TT\_SRPT\_SA) of title search pointer TT\_SRPT, are indicated by the relative number of logical blocks from the head logical block in which this table VMGI\_MAT was stored.

[0170] It is recorded on an optical disk 10 that such information of video manager information (VMGI) 75 corresponds with the boundary of a logical sector including the information used when reproducing



each video title set (VTS) 72 of drawing 8 .

[0171] The menu information (the video manager VMG manages) about the video data, audio data, and subimage data which were recorded on the optical disk 10 is stored in video object set VMGM\_VOBS for video manager information menus.

[0172] While being able to display explanation of the volume name of the optical disk which it is going to play, the voice accompanying a volume name display, and a subimage with this video object set (VMGM\_VOBS) for video manager information menus, a selectable item can be expressed as a subimage.

[0173] For example, the purport which contains the video which stored the game until it results in the world champion of the boxer X with the optical disk which it is going to play from now on with the video object set (VMGM\_VOBS) for video manager information menus (with gestalt of a single story or a multi-story) can be expressed now as a subimage. That is, Boxer's X fighting pose is reproduced by the video data with volume names, such as history of Boxer's X glory, and the voice output of his theme song will be carried out (if it is), and the chronology of his experience and military career etc. is further expressed as a subimage.

[0174] moreover, the narration voice of (1) game is reproduced in which language, such as English, Japanese, French, and German, for example, by the menu format as selections displayed with a subimage with the video object set (VMGM\_VOBS) for VMGM -- whether the title of predetermined language is displayed with (2) secondary image with that inquiry, and (3) -- any of selectable two or more language title are chosen -- that inquiry is outputted. In voice, English and a subimage title can choose [ a viewer (user of the DVD videocassette recorder mentioned later) ] Japanese from the display by this video object set (VMGM\_VOBS) for VMGM. In this way, the preparation which appreciates the video of a game of Boxer X will be completed.

[0175] Although it is that there were no descriptions, such as description using a subimage and/or voice which were mentioned above of the content of record, and option of a spoken language or title language or modification of a playback angle type mentioned above, in the conventional videocassette recorders (VHS mold VCR etc.), the DVD videocassette recorder of this invention can have these descriptions.

[0176] Drawing 22 shows the content of video manager information management table VMGI\_MAT of drawing 21 .

[0177] namely, to this video manager information management table VMGI\_MAT A video manager identifier A video manager; And the address (VMG\_ID) Video manager information; And the address (VMG\_EA) ; An applicable optical disk (VMGI\_EA) The version number of the specification which 10 adopts (DVD disk) ; A video manager's category (VERN) ; A volume setting-out identifier (VMG\_CAT) (VLMS\_ID); -- the number (VTS\_Ns) of availability (recordable capacity) FREE\_SPACE; video title sets of the optical disk 10 with which each video title set VTS of drawing 8 is recorded --; provider's (work and selling agency of software) identifier -- ; (PVR\_ID) A video manager information management table And the address ; (VMGI\_MAT\_EA) The start address of first play program chain information ; (FP\_PGCI\_SA) start address [ of the video object set of a video manager menu ] (VMGM\_VOBS\_SA); -- start address [ of a title search pointer table ] (TT\_SRPT\_SA); -- the start of the unit table of the program chain information on a video manager menu -- The address The start address of the start address (PTL\_MAIT\_SA); video title set attribute table which is; parental management information table (VTS\_ATTR\_SA); A text data manager's start address (VMGM\_PGCI\_UT\_SA) (TXTDT\_MG\_SA); -- start address [ of a video manager MENYUSERU address table ] (VMGM\_C\_ADT\_SA); -- the start address of a video MANEJAMENYUBIDEO object unit address map -- ; (VMGM\_VOBU\_ADMAP\_SA) The video attribute shown in a video manager menu ; (VMGM\_V\_ART) The number of audio streams shown in a video manager menu ; (VMGM\_AST\_Ns) The audio stream attribute shown in a video manager menu ; Subimage stream attribute (VMGM\_SPST\_ATR); shown in the number (VMGM\_SPST\_Ns) of subimage streams; video manager menu shown in a video manager menu (VMGM\_AST\_ATR) And first play program chain information (FP\_PGCI) is indicated.

[0178] In addition, the video copy flag and audio copy flag of a video manager and a video title set are indicated by category VMG\_CAT of the video manager of video manager information management table VMGI\_MAT. The propriety of the copy of video and voice is determined according to an individual by the content of these flags, respectively.

[0179] Availability (recordable capacity) FREE\_SPACE of drawing 22 becomes the same as the availability data within the physical format information on drawing 11 about the intact blank disc 10. In the storing approach of the availability of a disk 10, storing in the place (physical format information) of a file descriptor and storing in the place (VMGI\_MAT) of management information can be considered. The disk availability after carrying out the image transcription activity of this disk 10 selectively can be written in the availability parts of FREE\_SPACE of drawing 22, and/or the physical format information on drawing 11 (here, it will write in the both sides of FREE\_SPACE and physical format information). For example, in the case of one side DVD-RAM disk 10 with a capacity of 2.6GB, the information showing 2.6GB is written in the byte positions 17-20 of drawing 11. If it is in the condition which is not recorded on videotape at all on this disk 10, the information showing the value which deducted management data (the video manager VMG also contains) etc. from 2.6GB is written in FREE\_SPACE of drawing 22.

[0180] Although the information on the byte positions 17-20 of drawing 11 is 2.6GB supposing the image transcription for 1GB is made by this disk 10, the information on FREE\_SPACE of drawing 22 is rewritten by the amount of 1.6GB. If it sets to the DVD videocassette recorder which mentions such a disk 10 recorded [ partial ] on videotape later, it will detect that the disk 10 which this DVD videocassette recorder read the information on the byte positions 17-20 of drawing 11 first, and was set is a 2.6GB disk, and the availability of the disk 10 which read the information on FREE\_SPACE of drawing 22 next, and was set will detect that it is 1.6GB disk. If this disk 10 is all eliminated, the information on the availability parts of FREE\_SPACE of drawing 22 and the physical format information on drawing 11 will be rewritten by the amount of 2.6GB.

[0181] That is, even if it expresses the same "availability", the availability of drawing 11 and FREE\_SPACE of drawing 22 can give a difference to the content.

[0182] Drawing 23 shows the content of the video title set VTS72 of drawing 8. This video title set VTS consists of multiple-files 74B like the video manager VMG of drawing 21. Each file 74B includes the video title set information (VTSI) 94, the object set (VTSM\_VOBS) for video title set menus, the video object set for video title set titles (VTSTT\_VOBS; a maximum of 9 file), and backup (VTSI\_BUP) of video title set information.

[0183] As shown in drawing 23, to the video title set information VTSI94 arranged at the head of a video title set VTS72 A video title set information management table (VTSI\_MAT; indispensable), The title search pointer table for the par TOOBU titles (for example, chapter of a program) of a video title set (VTS\_PTT\_SRPT; indispensable), The program chain information table of a video title set (VTS\_PGCIT; indispensable), The program chain information unit table for video title set menus (indispensable, when VTSM\_PGCI\_UT;VTSM\_VOBS exists), A video title set time map table (VTS\_TMAPT; option), The cell address table for video title set menus (indispensable, when VTSM\_C\_ADT;VTSM\_VOBS exists), The video object unit address map for video title set menus (indispensable, when VTSM\_VOBU\_ADMAP;VTSM\_VOBS exists), The video title set cell address table (VTS\_C\_ADT; indispensable) and the video object unit address map for video title sets (VTS\_VOBU\_ADMAP; indispensable) are described by this sequence.

[0184] Drawing 24 shows the content of video title set information management table VTSI\_MAT of drawing 23.

[0185] In this video title set information management table VTSI\_MAT As shown in drawing 24, a video title set identifier (VTS\_ID), A video title set And the address (VTS\_EA) and the reproduced flag which shows whether full regeneration of the program (for example, VTS#1 of drawing 8) recorded on the optical disk 10 may be carried out even once (PLAY\_ENDFlag), The archive flag which achieves the function to prevent incorrect elimination to leave without erasing the program (for example, VTS#2 of drawing 8) recorded on the optical disk 10 (ARCHIVE Flag), Video title set information And the address (VTSI\_EA), The version number of the specification which the applicable optical disk (DVD disk) 10 adopts (VERN), A video title set information management table with the category (VTS\_CAT) of a video title set And the address (VTSI\_MAT\_EA), The start address of the video object set of a video title set menu (VTSM\_VOBS\_SA), The start address of the video object set of a video title set title (VTSTT\_VOBS\_SA), The start address of the PATOBU title search pointer table of a video title set (VTS\_PTT\_SRPT\_SA), The start address of the program chain information table of a video title set (VTS\_PGCIT\_SA), The start address of the unit table of the program chain information on a video title

set menu (VTSM\_PGCI\_UT\_SA), The start address of the time map table of a video title set (VTS\_TMAPT\_SA), The start address of the cell address table of a video title set menu (VTSM\_C\_ADT\_SA), The start address of the address map of the video object unit of a video title set menu (VTSM\_VOBU\_ADMAP\_SA), The start address of the cell address table of a video title set (VTS\_C\_ADT\_SA), The start address of the address map of the video object unit of a video title set (VTS\_VOBU\_ADMAP\_SA), Information, such as the attribute of video, an audio, and a subimage, and the number of subimage streams of a video title set (VTS\_SPST\_Ns), The multi-channel audio stream attribute table (VTS\_MU\_AST\_ATRT) of the subimage stream attribute table (VTS\_SPST\_ATRT) of a video title set and a video title set is indicated.

[0186] In addition, each information item of above-mentioned table VTSM\_MAT is arranged with the boundary of the logical block of the data recorded on an optical disk 10.

[0187] Drawing 25 shows the content of video title set program chain information table VTSI\_PGCIT of drawing 23.

[0188] As shown in drawing 25, video title set program chain information table information (VTS\_PGCITI), the video title set program chain information search pointer (VTS\_PGCI\_SRP#1 - VTS\_PGCI\_SRP#n), and the video title set program chain information (VTS\_PGCI) are contained in program chain information table VTS\_PGCIT of this video title set.

[0189] In addition, the established sequence of video title set program chain information VTS\_PGCI is set up regardless of two or more sequence of video title set program chain information search pointer VTS\_PGCI\_SRP#1 - VTS\_PGCI\_SRP#n. It is possible to follow, for example, to point to the same program chain information VTS\_PGCI by one or more program chain information search pointer VTS\_PGCI\_SRP.

[0190] Drawing 26 shows the content of video title set program chain information VTS\_PGCI of drawing 25. That is, program chain information (PGCI) is constituted by program chain general information (PGC\_GI; indispensable), the program chain command table (PGC\_CMDT; option), the program chain programmed map (PGC\_PGMAP; indispensable, when following C\_PBIT exists), the cel playback information table (C\_PBIT; option), and the cel positional information table (C\_POSIT; indispensable, when said C\_PBIT exists).

[0191] Drawing 27 shows the content of cel playback information table C\_PBIT of drawing 26. This cel playback information table C\_PBIT has a configuration as shown in drawing 27, and includes a maximum of 255 cel playback information (C\_PBI; #n=#1-#255).

[0192] Drawing 28 shows the content of cel playback information C\_PBI (C\_PBI#1-#n) of drawing 27. Namely, each cel playback information (C\_PBI) As shown in drawing 28, a cel category (C\_CAT; 4 byte), cel playback time amount (C\_PBTM; 4 byte), The start address of the video object unit (VOBU) of the beginning in a cel (C\_FVOBU\_SA; 4 byte), The INTARIBUDO unit (ILVU) of the beginning in a cel And the address (C\_FILVU\_EA; 4 byte), the start address (C\_LVOBU\_SA; 4 byte) of the last video object unit (VOBU) in a cel, and the last video object unit (VOBU) in a cel -- and the address (C\_LVOBU\_EA; 4 byte) is included.

[0193] Drawing 29 shows the content of cel category C\_CAT of drawing 28. This cel category (C\_CAT) shows the number of cel commands by 8 bits (b0-b7) of low order, as shown in drawing 29. The following 8 bits (b8-b15) show cel still time amount, and the following 5 bits (b16-b20) show a cel type (for example, is it karaoke?). The following 1 bit (b21) shows an access-restriction flag, and the following 1 bit (b22) shows a cel playback mode (for example, are they an animation or a still?). Fly a reservation bit and the following 1 bit (b24) shows a seamless angle-type modification flag. The following 1 bit (b25) shows the discontinuous flag (is STC reset or not?) of the system time clock STC. The following 1 bit (b26) shows an interleave arrangement flag (is the cel specified by C\_PBI a thing in a contiguous block, and is a thing in INTARIBUDO Brock?). The following 1 bit (b27) shows a seamless playback flag (should seamless playback of the cel specified by C\_PBI be carried out or not?). the following 2 bits (b28-b29) show a cell block type (for example, -- do angle iron or not?), and 2 bits (b30-b31) of the last show cell block mode (for example, the beginning in Brock -- do cel or not?).

[0194] It is shown here that cell block mode is not a cel in Brock at the time of 00b (b is binary mind), when it is 01b, it is shown that it is the cel of the beginning in Brock, when it is 10b, it is shown that it is a cel in Brock, and when it is 11b, it is shown that it is the cel of the last in Brock.

[0195] Moreover, when a cell block type is 00b, it is shown that they are not some applicable Brock, and

when it is 01b, applicable Brock shows that it is angle iron (Brock containing the cel of a multi-angle type).

[0196] The angle mark which is title reproducing containing a multi-angle-type cel, and is not illustrated when this cell block type is not 01b is supposed that the light is switched on.

[0197] On the other hand, if this cell block type =01b is detected during playback, the flash (or modification of a burning color or modification of the form of an angle mark) of the angle mark which is not illustrated can inform a viewer of it current angle iron being under playback. Thereby, a viewer can know that the image reconstruction of another angle type is possible about the image under playback now.

[0198] Moreover, when an interleave arrangement flag is 0b, it is shown that an applicable cel is a thing in a contiguous block (continuation record of two or more VOB(s) is carried out), and when an interleave arrangement flag is 1b, it is shown that an applicable cel is a thing in INTARIBUDO Brock (interleave record of the ILVU in which each contains one or more VOB(s) is carried out).

[0199] Moreover, when the seamless angle-type modification flag stands (=1b), it is shown that an applicable cel is the object of seamless playback, and when this flag does not stand (=0b), it is shown that an applicable cel is the object of non seamless playback.

[0200] Namely, it will be in the condition which can be non seamless angle-type changed by interleave arrangement flag =1b at the time of seamless angle-type modification flag =0b, and will be in the condition which can be seamless angle-type changed by interleave arrangement flag =1b at the time of seamless angle-type modification flag =1b.

[0201] In addition, if the very early media drive system (the system which can access the head of the angle iron of a request within the one-frame period of video; it does not necessarily limit to an optical disk drive system) of the access time is used, quick angle-type modification is realizable between interleave arrangement flag =0b (separate angle-type cel), i.e., the set of VOB by which interleave record is not carried out.

[0202] When the optical disk 10 with a comparatively slow access rate is used as an archive medium, it is good to assign a part for the recording track 1 round of the disk to record for INTARIBUDO Brock 1 individual. Then, at the time of the jump between contiguity INTARIBUDO Brock (angle-type modification), since what is necessary is just to move slightly by one track radially, as for the trace place of an optical head, the track jump (it is suitable for seamless angle-type modification) of a disk which does not almost have time lag becomes possible. In this case, when the track jump for 1 video object unit (VOB) is carried out, the time lag for one revolution of max and a disk may arise. Therefore, angle-type modification accompanied by the jump of a VOB unit is suitable for non seamless angle-type modification.

[0203] Here, the content of the seamless angle-type modification flag is usually beforehand determined by the provider (software maker who makes the content of a program of each title recorded on an optical disk 10). That is, a provider can decide to make [ whether to make it non seamless angle-type modification or ] it seamless angle-type modification uniquely by deciding the content of the seamless angle-type modification flag beforehand.

[0204] However, after reading the cell data of an applicable title set in an optical disk, it is possible to constitute a DVD videocassette recorder so that a viewer (user of the DVD videocassette recorder mentioned later) can change the content of the seamless angle-type modification flag in reading data into arbitration.

[0205] In addition, since a seamless angle-type modification flag is a flag with which the angle-type information (not shown) indicated in the navigation pack 86 shows a seamless angle type or a non seamless angle type, when this flag is changed, the need of correcting angle-type information in the navigation pack 86 (not shown) (for example, modification to non seamless angle-type information from seamless angle-type information) comes out.

[0206] Moreover, when a cel playback mode is 0b, carrying out continuation playback within a cel is shown, and when it is 1b, carrying out still playback by each VOB which exists in a cel is shown.

[0207] Moreover, when a user performs image transcription, playback, etc., an access-restriction flag can be used when forbidding the direct selection by user actuation. For example, a user can be forbidden from eating the reply in question secretly by setting to 1b the access-restriction flag of a cel with which the reply of a collection of problems was recorded.

[0208] Moreover, a cel type can show the following according to the 5-bit content, when for example, the applicable cel is created for karaoke.

[0209] Namely, if it is 00000b, cel type assignment is not made, but if it is 00001b, the title image of karaoke is specified. If it is 00010b, the intro of karaoke is specified, and if it is 00011b, song parts other than Climax (rust) are specified. If it is 00100b, the song part of the 1st Climax is specified, and if it is 00101b, the song part of the 2nd Climax is specified. If it is 00110b, the song part of male vocal is specified, and if it is 00111b, the song part of female vocal is specified. If it is 01000b, the song part of man-and-woman mixed-voices vocal is specified, and if it is 01001b, an interlude (performance of only musical instrument) part is specified. If it is 01010b, the fade-in of an interlude is specified, if it is 01011b, the fade-out of an interlude is specified, if it is 01100b, the 1st ending performance part is specified, and if it is 01101b, the 2nd ending performance part is specified. The content of the five remaining bit codes can be used for other applications.

[0210] In addition, angle-type modification is applicable also to angle-type modification of the background video of karaoke. (for example, the whole body image of the singer who sings guide vocal, the rise image of a face, the rise image of the month, etc. -- a karaoke sound -- easy flow -- meeting -- seamless -- or -- a few -- before -- returning -- non, a viewer angle-type-modification-keeps wished during the repeat playback between request vibrant tunes further seamlessly.)

Moreover, it is specified that it is not a still when the content of 8 bit of the cel still time amount of drawing 29 is 00000000b, when it is 11111111b, a still without the time limit is specified, and when they are 00000001b-11111110b, the still display of the die length which carried out the second numeral of the decimal number (1-254) specified from this content is specified.

[0211] Moreover, the number of cel commands shows the number of commands which should be performed at the time of playback termination of an applicable cel.

[0212] Drawing 30 shows the content of program chain general information PGC\_GI of drawing 26.

[0213] As shown in drawing 30, to program chain general information PGC\_GI The content (PGC\_CNT) of the program chain, and the playback time amount of a program chain (PGC\_PB\_TM), The user actuation control information of a program chain (PGC\_UOP\_CTL), The control table of a program chain audio stream (PGC\_AST\_CTLT), The control table of a program chain secondary image stream (PGC\_SPST\_CTLT), The navigation control information of a program chain (PGC\_NV\_CTL), The subimage pallet of a program chain (PGC\_SP\_PLT), The starting address of the command table of a program chain (PGC\_CMDT\_SA), The starting address of the programmed map of a program chain (PGC\_PGMAP\_SA), The starting address (C\_PBIT\_SA) of the playback information table of the cel in a program chain and the starting address (C\_POSIT\_SA) of the positional information table of the cel in a program chain are indicated.

[0214] Content PGC\_CNT of a program chain shows the number of programs and the number of cels (a maximum of 255) in the program chain. The number of programs is set to "0" with a program chain without the video object VOB.

[0215] Playback time amount PGC\_PB\_TM of a program chain shows the sum total playback time amount of the program in the program chain with time amount, a part, a second, and the frame number of video. The flag (tc\_flag) which shows the type of a video frame is also described by this PGC\_PB\_TM, and a frame rate (per second 25 frames or per second 30 frames) etc. is specified according to the content of this flag.

[0216] User actuation control information PGC\_UOP\_CTL of a program chain shows the user actuation forbidden in the program chain under playback.

[0217] Control table PGC\_AST\_CTLT of a program chain audio stream can include the control information of each eight audio stream. The conversion information on the audio stream number decoded from the flag (availability flag) and audio stream number which show whether the audio stream of such control information of each is available within an applicable program chain is included.

[0218] Control table PGC\_SPST\_CTLT of a program chain secondary image stream includes the conversion information on the flag (availability flag) which shows whether the subimage stream is available within an applicable program chain, and the subimage stream number decoded from a subimage stream number (32 pieces).

[0219] Navigation control information PGC\_NV\_CTL of a program chain Next\_PGCN which shows the program chain number which should be reproduced to the degree of the program chain under current

playback, Previous\_PGCN which shows the program chain number (PGCN) quoted by a navigation command "LinkPrevPGC" or "PrevPGC\_Search()", GoUp\_PGCN which shows the program chain number which should be carried out a return from the program chain, PG which shows the playback modes (sequential playback, random playback, and shuffle playback etc.) of a program Playback Still which indicates the still time amount after playback of the program chain to be mode time value is included.

[0220] Subimage pallet PGC\_SP\_PLT of a program chain has described the luminance signal of 16 sets and two color-difference signals which are used by the subimage stream in the program chain.

[0221] Starting address PGC\_CMDT\_SA of the command table of a program chain is the descriptor area for the cel command executed after the PURIKO mand performed before PGC playback, the postcommand executed after PGC playback, and cel playback.

[0222] Starting address PGC\_PGMAP\_SA of the programmed map of a program chain describes the starting address of programmed map PGC\_PGMAP which shows the configuration of the program in the program chain with the relative address from the cutting tool of the beginning of the program chain information PGCI.

[0223] Starting address C\_PBIT\_SA of the playback information table of the cel in a program chain describes the starting address of cel playback information table C\_PBIT which determines the playback sequence of the cel in the program chain with the relative address from the cutting tool of the beginning of the program chain information PGCI.

[0224] Starting address C\_POSIT\_SA of the positional information table of the cel in a program chain describes the starting address of cel positional information table C\_POSIT which shows the VOB identification number and cel identification number which are used within the program chain with the relative address from the cutting tool of the beginning of the program chain information PGCI.

[0225] Drawing 31 has illustrated the configuration of the equipment (DVD videocassette recorder) which carries out record playback of the digital animation information at an adjustable record rate using the information on structure that it explained to the disk of drawing 1 by drawing 3 - drawing 30.

[0226] The body of equipment of the DVD videocassette recorder shown in drawing 31 is said roughly, carries out revolution actuation of DVD-RAM or the DVD-R disk 10, and consists of the disk drive section (32, 34 grades) which performs informational R/W to this disk 10, the encoder section 50 which constitutes an image transcription side, the decoder section 60 which constitutes a playback side, and microcomputer Brock 30 who controls actuation of the body of equipment.

[0227] The encoder section 50 is equipped with ADC (analog-to-digital converter) 52, the video encoder (V encoder) 53, the audio encoder (A encoder) 54, the subimage encoder (SP encoder) 55, a formatter 56, and buffer memory 57.

[0228] The analog TV signal + analog sound signal from the external analog video signal + external analog audio signal or the TV tuner 44 from AV input section 42 is inputted into ADC52. This ADC52 digitizes the inputted analog video signal with the sampling frequency of 13.5MHz, and the quantifying bit number of 8 bits. (namely, the brightness component Y, the color difference component Cr (or Y-R), and the color difference component Cb (or Y-B) -- it quantizes by 8 bits, respectively.) Similarly, ADC52 digitizes the inputted analog audio signal with the sampling frequency of 48kHz, and the quantifying bit number of 16 bits.

[0229] In addition, when an analog video signal and a digital audio signal are inputted into ADC52, ADC52 carries out the through pass of the digital audio signal. (The processing which reduces only the jitter which does not change but accompanies a digital signal, or the processing of the content of the digital audio signal which changes a sampling rate and a quantifying bit number is good in a limping gait).

[0230] On the other hand, when a digital video signal and a digital audio signal are inputted into ADC52, ADC52 carries out the through pass of a digital video signal and the digital audio signal (jitter reduction processing, sampling rate modification processing, etc. are good in a limping gait, without changing the content also to these digital signals).

[0231] The digital video signal component from ADC52 is sent to a formatter 56 through the video encoder (V encoder) 53. Moreover, the digital audio signal component from ADC52 is sent to a formatter 56 through the audio encoder (A encoder) 54.

[0232] The V encoder 53 has the function to change the inputted digital video signal into the digital

signal compressed with the Variable Bit Rate based on MPEG 2 or MPEG1 specification.

[0233] Moreover, the A encoder 54 has the function to change the inputted digital audio signal into the digital signal (or digital signal of Linear PCM) compressed with the fixed bit rate based on MPEG or AC-3 specification.

[0234] When the DVD video signal of a data configuration as shown in drawing 14 and drawing 15 is inputted from AV input section 42 (for example, signal from the DVD video player with an independent output terminal of a subvideo signal), or when the DVD video signal of such a data configuration is broadcast and it is received by the TV tuner 44, the subvideo-signal component in a DVD video signal (subimagery pack) is inputted into the subimage encoder (SP encoder) 55. The subimage data inputted into the SP encoder 55 are arranged by predetermined signal aspect, and are sent to a formatter 56.

[0235] Using buffer memory 57 as a work area, a formatter 56 performs predetermined signal processing to the inputted video signal, an audio signal, a subvideo signal, etc., and outputs the record data corresponding to a format (file structure) which was explained by drawing 3 - drawing 30 to a data processor 36.

[0236] Here, the standard content of encoding processing for creating the above-mentioned record data is explained briefly. That is, if encoding processing is started in the encoder section 50 of drawing 31, a required parameter will be set up in encoding of video (main image) data and audio data. Next, the PURIEN code of the main image data is carried out using the set-up parameter, and distribution of the optimal amount of signs for the set-up average transfer rate (record rate) are calculated. In this way, encoding of the main image is performed based on the amount distribution of signs obtained in PURIEN code. At this time, encoding of audio data is also performed simultaneously.

[0237] As a result of a PURIEN code, when the amount of data compressions is inadequate (when the video program of hope has not been settled in the DVD-RAM disk or DVD-R disk which it is going to record on videotape), If it can have an opportunity to carry out a PURIEN code again, (if the source of an image transcription is the source in which repeated regeneration, such as a video tape or a videodisk, is possible) Partial re-encoding of the main image data is performed, and the main image data of the re-encoded part are permuted by part for the main image data division which carried out the PURIEN code before it. The main image data and audio data are encoded by such a series of processings, and the value of an average bit rate required for record is substantially reduced by them.

[0238] A parameter required to encode subimage data similarly is set up, and the encoded subimage data are created.

[0239] The main image data, audio data, and subimage data which were encoded as mentioned above are put together, and it is changed into the structure of a video title set VTS.

[0240] That is, the cel as a smallest unit of the main image data (video data) is set up, and cel playback information (C\_PBI) as shown in drawing 28 is created. Next, the configuration of the cel which constitutes a program chain as shown in drawing 8, the main image, a subimage, the attribute of an audio, etc. are set up (the information acquired when a part of such attribute information encoded each data is used), and information management table information (VMGI\_MAT of drawing 22 and VTSI\_MAT of drawing 24) including various information is created.

[0241] The main image data, audio data, and subimage data which were encoded are subdivided by the pack of fixed size (2048 bytes) as shown in drawing 15. A dummy pack is suitably inserted in these packs. In addition, in packs other than a dummy pack, time stumps, such as PTS (presentation time stump) and DTS (decoding time stump), are described suitably. About PTS of a subimage, the time amount which delayed arbitration from PTS of the main image data of the same playback time zone or audio data can be described.

[0242] And each data cell is arranged, arranging the navigation pack 86 at the head in VOB85 unit in order of the time code of each data, so that it may be refreshable, and VOB83 which consists of two or more cels as shown in drawing 14 is constituted. VOBS82 which summarized this VOB83 one or more is formatted into the structure of VTS72 of drawing 8.

[0243] In addition, since the content of the above-mentioned cel, a program chain, a managed table, the time stump, etc. had been decided since the start when carrying out the digital copy of the DVD regenerative signal from a DVD video player, it is not necessary to create these anew. (However, in order to constitute a DVD videocassette recorder so that the digital copy of the DVD regenerative signal can be carried out, the copyright safeguard of an electronic watermark and others needs to be provided.)



The disk drive section which performs informational R/W (an image transcription and/or playback) to the DVD disk 10 is equipped with the disk changer section 100, a disk drive 32, the memory section 34, the data processor 36, and the system time counter (or a system time clock; STC) 38.

[0244] The memory section 34 carries out buffer IRINGU of the part for the constant rate of the data (data outputted from the encoder section 50) written in a disk 10 through a disk drive 32, or is used for carrying out buffer IRINGU of the part for the constant rate of the data (data inputted into the decoder section 60) reproduced from the disk 10 through the disk drive 32.

[0245] For example, when the memory section 34 consists of semiconductor memory (DRAM) which is 4 M bytes, the record for about 8 seconds or buffering of playback data is possible at the record rate of an average of 4 Mbps(es). Moreover, when the memory section 34 consists of EEPROMs (flash memory) which are 16 M bytes, buffering of the record for about 30 seconds or playback data is possible at the record rate of an average of 4 Mbps(es). Furthermore, when the memory section 34 consists of micro HDD (hard disk) which is 100 M bytes, buffering of the record for 3 minutes or more or playback data is attained at the record rate of an average of 4 Mbps(es).

[0246] The memory section 34 can be used for storing temporarily image transcription information until it is exchanged for a disk with a new disk 10 when the disk 10 has been exhausted in the middle of an image transcription.

[0247] Moreover, the memory section 34 can be used also for storing temporarily the data by which reading appearance was more nearly usually than a drive carried out to the excess into fixed time amount when a high-speed drive (two X or more) is adopted as a disk drive 32. Even when the reading data at the time of playback were buffered in the memory section 34, the optical pickup which is not illustrated with an oscillating shock etc. reads and an error is caused, a playback image can be prevented from breaking off by using it, changing the playback data buffered by the memory section 34.

[0248] Although not illustrated in drawing 31, if the external card slot is prepared in the DVD videocassette recorder, Above EEPROM can carry out an option as an IC card of an option. Moreover, if the external drive slot or the SCSI interface is prepared in the DVD videocassette recorder, the option of the above HDD can be carried out as an extended drive of an option.

[0249] The data processor 36 of drawing 31 follows microcomputer Brock's 30 control. Supply the DVD record data from the encoder section 50 to a disk drive 32, or Take out the DVD regenerative signal reproduced from the disk 10 from drive 32, or The management information (the directory record of drawing 13, VMGI\_MAT of drawing 22, VTSI\_MAT of drawing 24, etc.) recorded on the disk 10 is rewritten, or the data (a file or VTS) recorded on the disk 10 are deleted.

[0250] Microcomputer Brock 30 contains ROM in which MPU (or CPU), a control program, etc. were written, and RAM which offers a work area required for program execution.

[0251] This microcomputer Brock's 30 MPU performs the availability detection mentioned later, the amount (number of image transcription packs) detection of records, residue detection, warning, recording-mode modification directions, and other processings according to the control program stored in that ROM, using that RAM as a work area.

[0252] The content of which the user of a DVD videocassette recorder should be notified among the activation results of MPU30 is displayed on the display 48 of a DVD videocassette recorder, or is expressed on a monitor display as an onscreen display.

[0253] In addition, MPU30 can perform timing which controls the disk changer section 100, a disk drive 32, a data processor 36, the encoder section 50, and/or the decoder section 60 based on the time data from STC38 (although actuation of an image transcription and playback is usually performed synchronizing with the timer clock from STC38, the other processing may be performed to the timing which became independent in STC38).

[0254] The separator 62 which the decoder section 60 separates each pack from DVD playback data with pack structure as shown in drawing 14, and is taken out, The memory 63 used at the time of signal-processing activation of pack separation and others, and the video decoder 64 which decodes the main image data (the content of the video pack 88 of drawing 14) separated with the separator 62 (V decoder), The subimage decoder 65 which decodes the subimage data (the content of the subimagery pack 90 of drawing 14) separated with the separator 62 (SP decoder), The audio decoder 68 which decodes the audio data (the content of the audio pack 91 of drawing 14) separated with the separator 62 (A decoder), The video processor 66 which compounds suitably the subimage data from the SP decoder



65 from the V decoder 64 to a video data, and outputs the subimage of a menu, a highlights carbon button, and a title and others to the main image in piles, The video digital-analog converter 67 which changes the digital video output from the video processor 66 into an analog video signal (V-DAC), It has the audio digital-analog converter (A-DAC) 67 which changes the digital audio output from the A decoder 68 into an analog audio signal.

[0255] The analog video signal from V-DAC67 and the analog audio signal from A-DAC67 are supplied to output unit 46a (the multi-channel stereo unit + monitor TV of two - six channels, or projector) through AV output section 46.

[0256] The OSD data outputted from MPU30 are inputted into the separator 62 of the decoder section 60, pass the V decoder 64 and are inputted into the video (especially decoding is not carried out) processor 66. Then, the main image is overlapped on this OSD data, and the external monitor TV by which it was connected to AV output section 46 is supplied. Then, a warning sentence is displayed with the main image.

[0257] Moreover, the printer interface P1 is connected to MPU30. Furthermore, the printer P2 is connected to this printer interface P1. This printer P2 prints out the image based on the various data reproduced from an optical disk 10 in predetermined locations (the label attached to an optical disk and an optical disk, cartridge which holds an optical disk).

[0258] Drawing 32 shows the appearance of the body 200 of equipment of the DVD videocassette recorder of drawing 31 , and an example of the front panel.

[0259] If a user pushes opening/closing carbon button 5g of a remote controller 5 later mentioned with reference to drawing 33 , the disk tray inlet port 202 of drawing 32 will open to the front.

[0260] DVD-RAM, the DVD-RW disk (disk containing a cartridge) 10, or the DVD-R disk (nakedness disk) 10 used for an image transcription is set to this disk tray.

[0261] Then, if a user pushes [ a user ] opening/closing carbon button 5g of a remote controller 5, the disk (for example, DVD-RW) 10 with which the disk tray inlet port 202 was set to closing and a tray will be drawn in the disk drive 32 within the body 200 of equipment.

[0262] then, the disk drive 32 -- automatic -- starting -- first -- the physical format information on drawing 11 (disk structure data --) It is read by MPU30. the availability data of a blank disc, and others - - containing -- then, the video manager information management table (information FREE\_SPACE a substantial availability is shown --) of drawing 22 others are included -- and the video title set information management table (it Flag(s) PLAY\_END [ ] which shows whether it is finishing [ a specific title set / playback ] --) of drawing 24 ARCHIVE a specific title set indicates it to be whether it is a permanent preservation condition Flag and others -- containing -- it is read by MPU30.

[0263] Then, when the set disk 10 is an intact DVD-RW disk (or DVD-RAM disk), it is displayed in the DVD videocassette recorder display (liquid crystal or fluorescence display panel) 48 of drawing 32 that the item of "DVD-RW" is conspicuous. Moreover, image transcription time amount is displayed like 00 (time amount):00 (minute):00 (second), and an image transcription title / chapter is also displayed as 00-00 (once it is recorded on videotape, this image transcription title / chapter display will change like 01-01).

[0264] Moreover, if an equipment default or user setting out serves as recording-mode =MPEG 2 and average bit rate =4Mbps of an image transcription, it will be displayed that the item of "MPEG 2" and "4Mbps" is conspicuous in a display 48.

[0265] Furthermore, the image transcription to the set disk 10 advances, MPU30 detects that and the residual time which can be recorded on videotape on the disk 10 is displayed that the item of "DISK TO BECHANGED" to which disk-swapping is urged is conspicuous with it being small (for example, 5 more minutes) in a display 48, if it becomes.

[0266] the front panel of the body 200 of a DVD videocassette recorder -- further -- an electric power switch carbon button, opening/closing key, a playback key, a stop key, and the skip key of a chapter/program -- the return key and the basic operation key of a rapid-traverse key image transcription initiation carbon button (not shown) and others are already prepared.

[0267] In addition, the DVD videocassette recorder of drawing 32 assumes the case where the disk changer section 100 of drawing 31 is not built in (when the disk changer section 100 is connected to the body 200 of equipment of drawing 32 by a SCSI cable etc. as an external device of an option). in this case, the disk 10 set in the body of equipment during the image transcription is exhausted -- the above

"DISK TO BE CHANGED" of a display 48 starts luminescence or a flash in front for a while. If the remaining capacity of a disk 10 becomes zero after that, an image transcription will come to be automatically continued to the DVD-RW disk 10 of one or more sheets set in the external disk changer section 100.

[0268] Or it is also possible to prepare two or more sets of DVD videocassette recorders, to make DEJI chain connection of each MPU30 with the telecommunication cable, and to carry out the relay image transcription using two or more sets of DVD videocassette recorders. In this case, it was also able to say, "MPEG 2/average bit rate 4Mbps is recorded on videotape by the 1st set of a recorder for 1 hour, and MPEG 2/average bit rate 2Mbps is recorded on videotape by the 2nd set of recorders for 2 hours."

[0269] When carrying out the relay image transcription by two or more DVD videocassette recorder which was mentioned above, the display of "recording MPEG 2/average bit rate 4Mbps on videotape by Recorder A for 1 hour, and recording MPEG 2/average bit rate 2Mbps on videotape by Recorder B for 2 hours" may be displayed on a monitor screen.

[0270] In addition, the DVD videocassette recorder of drawing 31 is constituted so that warning or advice to a user may not be recorded on videotape on a disk 10. However, image transcription information (the average bit rate of an image transcription, an image transcription channel number, image transcription time, etc.) which was illustrated to the monitor screen down side may be made to be recorded on a disk 10 for [ of an immediately after / image transcription initiation ] several seconds.

[0271] Drawing 33 shows an example of the remote controller 5 which operates the DVD videocassette recorder of drawing 31. Also by the actuation key prepared in the front panel of the body 200 of a DVD videocassette recorder shown in drawing 32, although fundamental actuation is possible, a remote controller 5 performs various actuation in which the description of DVD was employed efficiently.

[0272] Hereafter, the function (or usage) of each key of the remote controller 5 of drawing 33 is explained.

[0273] [The function of power-source key (POWER) 5a]

It turns on / turns off secondary [ of the AC-power-supply circuit of the body of <1> equipment ].

[0274] Where a disk is set to the interior of <2> equipment, when a power-source key is pressed, the class (DVD-RW, DVD-R, or DVD video) of disk is distinguished and displayed. That is displayed when the disk is a playback impossible disk.

[0275] If a power-source key is pressed when the disk set to the interior of <3> equipment contains a first play program chain (auto start code), playback of this program chain will be started automatically.

[0276] When a power-source key is pressed in the state of <4> power-source ON and tray opening, power-source OFF comes after tray closing.

[0277] [An opening/closing key (OPEN/CLOSE) 5g function]

<5> disk tray is opened or closed. If opening/closing key is pressed during disk playback, the equipment actuation till then is completed and a disk tray opens. Let actuation of this key 5g be an invalid during an image transcription.

[0278] If opening/closing key is pressed by <6> power-source OFF and tray close status, a power source turns on and a disk tray opens.

[0279] If opening/closing key is pressed in the state of <7> disk tray opening, a disk tray will be drawn in the body of equipment. If the disk is set to the tray at this time, that management information will be read and the class (DVD-RW, DVD-R, or DVD video) of set disk will be displayed. That is displayed when the disk is a playback impossible disk.

[0280] If opening/closing key is pressed in the state of <8> disk tray opening, a disk tray will be drawn in the body of equipment. If the disk is not set to the tray at this time, the alphabetic character "NO DISK" is displayed on a display 48 or Monitor TV, for example (OSD).

[0281] When the disk drawn in the body of equipment by ON of <9> opening / closing key contains a first play program chain (auto start code), playback of this program chain is started automatically.

[0282] [The function of stop key (STOP) 5e]

If pushed during <10> disk playback or an image transcription, playback or an image transcription will be stopped. If pushed during a halt, the title number (or title number of default setting) which was being reproduced or recorded on videotape till then will be displayed.

[0283] [The function of playback key (PLAY) 5c]

If pushed in the condition that the disk is set to <11> disk tray, playback of a disk will begin by the

setups (the aspect ratio of the screen which default setting or a user set up, a spoken language, title language, etc.) in the event.

[0284] After setting a disk on a tray in the state of <12> disk tray opening, when a playback key is pressed, a tray is drawn in the body of equipment and playback is started from the default title (or title specified by a title maker) currently recorded on the DVD disk. However, it is performed when a disk contains a first play program chain (auto start code).

[0285] Playback actuation will be ended, if it reproduces until a title finishes unless it specifies especially by the recording information of <13> disks.

[0286] If pushed in the condition that the chapter and the title number are set up on the setting-out screen during <14> storage-configuration screen display, memory playback will be started from the place of the set-up chapter and a title number.

[0287] If it is pushed when <15> random modes are set up, random playback of the content of the disk set to the tray will be carried out.

[0288] When the cel playback mode of a disk becomes a still during <16> playbacks, the playback actuation till then is canceled and it will be in a still picture playback condition.

[0289] [A halt key (PAUSE) 5d function]

<17> If pushed during the program chain playback in a certain title, it will become a still picture with the video frame of the program chain under present playback. If a halt key is further pressed in this condition, it will change to the still picture of the following frame. Like the following, whenever it presses a halt key, a frame changes to a time amount travelling direction, and coma delivery for the count which pressed this key is performed.

[0290] It can avoid reproducing voice, although a subimage is reproduced during the <18> above-mentioned still picture or coma delivery playback.

[0291] <19> This still picture / coma delivery are possible only within the program chain under present playback, and after coma delivery is carried out to the last frame in a title, this key stroke serves as an invalid.

[0292] When it is a still by <20> cel playback mode, in the last cel of a still cel, this key stroke serves as an invalid.

[0293] <21> If a playback key is pressed in the state of the still picture by this key stroke, it will usually return to playback.

[0294] [-- skip key (Mark SKIP / two-step Misumi with right sense vertical line) 5f \*\*\*\* -- the case of the 1;1 sequence-program-control-method chain title --]

If pushed during <22> playbacks, the next chapter in the title under present playback (or program) will be searched, and it will be reproduced. When there is no following chapter, this key stroke serves as an invalid. During a chapter search, a user can be notified of the search place chapter number of a display 48 (or OSD) being blinked, and it being under search.

[0295] If it pushes during <23> halt, the next chapter of the present chapter will be chosen. The selected chapter will be searched and reproduced if a playback key is turned on here.

[0296] In addition, in a halt, a skip of the chapter (or program) over two titles can be performed. For example, if this skip key is further pushed when the last chapter number of a title 1 is displayed, the first chapter number of a title 2 will be chosen. If a playback key is turned on here, the selected chapter (chapter 1 of a title 2) will be searched and reproduced.

[0297] If it continues being pushed beyond predetermined time by <24> idle states, a chapter number will advance every [ 1 ] at a fixed rate (when there is a title which is a degree, continuation modification of the chapter number over degree title is enabled from the present title). If a playback key is pressed after detaching this skip key that it is continuing pushing, the chapter of the title at that time will be searched and reproduced.

[0298] [-- skip key (Mark SKIP / two-step Misumi with right sense vertical line) 5f \*\*\*\* -- the case of the 2; random program chain title --]

If it pushes during <25> playbacks, the chapter (or program) by which random selection was made will be searched to the degree of the chapter in the title under present playback, and it will be reproduced. However, the count of a random playback loop formation is the last, and when there is no following program chain into a title, this key stroke serves as an invalid.

[0299] When pushed during <26> still-picture playback, the selected chapter (or program) is searched

and it becomes still picture playback at the head. However, when having become a still by the cel playback mode, the selected chapter is searched and the still of the head is reproduced.

[0300] It can be used for selections (the increment of a figure, or front migration of cursor) of the chapter number (program number) set up on <27> storage configuration screens, and a title number.

[0301] It can be used for page delivery of <28> menus.

[0302] [-- skip key (Mark SKIP / two-step Misumi with left sense vertical line) 5f \*\*\*\* -- the case of the 1;1 sequence-program-control-method chain title --]

If pushed during <29> playbacks, the head of the chapter under present playback (or program) will be searched, and it will be reproduced. If it furthermore pushes continuously, to the chapter number 1, a chapter number will wind every [ 1 ] and will fall.

[0303] If it pushes during <30> halt, the chapter in front of [ of the present chapter ] one will be chosen. The selected chapter will be searched and reproduced if a playback key is turned on here.

[0304] In addition, in a halt, a skip of the chapter (or program) over two titles can be performed. For example, if this skip key is further pushed when the chapter number 1 of a title 3 is displayed, the chapter number X of the last of a title 2 will be chosen. If a playback key is turned on here, the selected chapter (the chapter X of a title 2) will be searched and reproduced.

[0305] The bottom of chapter \*\*\*\* which straddled this title can perform a \*\* skip until it becomes the chapter 1 of a title 1.

[0306] If it continues being pushed beyond predetermined time by <31> idle states, at a fixed rate, a chapter number will wind every [ 1 ] and will fall (until it becomes the chapter 1 of a title 1). If a playback key is pressed after detaching this skip key that it is continuing pushing, the chapter of the title at that time will be searched and reproduced.

[0307] [-- skip key (Mark SKIP / two-step Misumi with left sense vertical line) 5f \*\*\*\* -- the case of the 2; random program chain title --]

If it pushes during <32> playbacks, the head of the chapter in the title under present playback (or program) will be searched, and it will be reproduced. However, even if it pushes continuously, a search place can serve as a head of the chapter under present playback (program).

[0308] When pushed during <33> still-picture playback, chapter (or program) \*\* under present playback carries out a head search, and it becomes still picture playback there. When having become a still by the cel playback mode, the chapter under present playback is searched and the still of the head is reproduced.

[0309] It can be used for selections (the decrement of a figure, or setback of cursor) of the chapter number (program number) set up on <34> storage configuration screens, and a title number.

[0310] It can be used for page return of <35> menus.

[0311] [A menu screen key (MENU) 5n function]

When <36> disks are set to the tray, the repeat display of the root menu within the video title set under present selection currently recorded on the disk is carried out. When the disk is not set, an error (or warning) display is performed (OSD).

[0312] When there is no root menu into the video title set under <37> current selection, an error (or warning) display is performed.

[0313] <38> If it slips out of a menu by menu manipulation after usually pushing this menu screen key during playback and reproducing a menu, playback will be resumed from the part specified with the part or menu which was being reproduced before menu playback.

[0314] When it pushes during <39> root menu display, it returns to the condition before a root menu display.

[0315] [The function of title key (TITLE) 5p]

A title menu is displayed, when <40> disks are set to the tray and the title menu is recorded on the disk. When the disk is not set, an error (or warning) display is performed (OSD).

[0316] When the title menu is not recorded on the disk set to <41> trays, the following actuation can be performed during disk playback (or under a halt).

[0317] That is, a push on a title key displays a title number and a chapter number on some screens (for example, upper left corner). If predetermined time (for example, 3 seconds) passes while the clear key mentioned later is pushed, a title key is pressed once again or there has been no subsequent key stroke, a title number and a chapter number will be eliminated from a screen.

[0318] A screen display will be set to "title number:2" and "chapter number:1", if a desired title number (for example, "2") is inputted into a screen from a ten key in the condition that the title number (for example, "1") and the chapter number (for example, "1") are displayed and it will say in the above-mentioned example. or [ pressing a playback key in this condition ] -- or if predetermined time (for example, 2 seconds) neglect is carried out, playback will be started from the chapter 1 of a title 2.

[0319] In this case, a user can be notified of the search place title number and chapter number of a display 48 being blinked, and it being under search during the search of a title and a chapter.

[0320] <42> When a title key is again pressed before selection of a title was decided after usually pressing a title key during playback and becoming title menu playback, playback is resumed from the part which was being reproduced before title menu playback.

[0321] [The function of a selection key / cursor key (upward and downward Mark Misumi pair) 5q]  
It is used for the item selection in <43> disk menu (menu called by the title key or the menu screen key), and the item selection in a setup menu. For example, when the item which has pushed facing up of the above-mentioned selection key / cursor key or downward Mark Misumi is chosen and that item contains the selection branch of further some, the facing the left of this selection key / cursor key or right sense Mark Misumi can be used for choosing that selection branch.

[0322] If upward Mark Misumi of this selection key is pushed when pushing while set point displaying either <44> audio stream, a subimage stream or an angle type, it will change to a following stream or a following angle type, and if downward Mark Misumi is pushed, it will change to the stream or angle type in front of one.

[0323] If upward Mark Misumi of this selection key is pushed when pushing during the title number display by <45> character generators, it will change to the following title, and if downward Mark Misumi is pushed, it will change to SUTAITORU in front of one.

[0324] [The function of end key (END) 5end]

It is used when notifying termination of processing of <46> own-alternative setting out to equipment (when escaping from processing loop formations, such as setting out of a refreshable angle type).

[0325] Said selection key / cursor key 5q, or ten key 5t mentioned later can be used for cursor actuation which chooses a desired angle type while selection-menu screen (not shown) displaying a multi-angle type. (Although a graphic display is not carried out, mouse actuation or touch panel actuation is also realizable.)

[A definite key (ENTER) 5s function]

It is used when deciding the item chosen within <47> disk menu or the setup menu.

[0326] It can be used also when deciding a title number and a chapter number in <48> memory screens.

[0327] [The function of return key (RETURN) 5r]

It is used when <49> title maker (provider of software) performs the search to the address on the disk set up beforehand. When directing the return (return) actuation to the ejection or the point starting [ playback ] (restart) from a menu, specifically, it is pushed. Or it can be used, also when directing the actuation which returns to the selection branch point of the multi-story in which an own alternative is possible while reproducing one of multi-stories.

[0328] \*\*\*\* of [audio key (AUDIO) 5aud -- the case under the 1; playback --]

If an audio key is pressed during <50> playbacks, the language name of the audio stream under present playback will be indicated by predetermined time (for example, 3 seconds) on a playback screen using a character generator (OSD). (after investigating the audio stream information recorded on the disk) (when the classification of an audio stream is language, such as music) If an audio key is further pressed during this display, the voice of the following audio stream number will come to be reproduced. If this audio key stroke is repeated, the voice (various language) of the audio stream currently recorded on that title will be reproduced cyclically one by one.

[0329] By pushing said selection key / cursor key 5q during the screen display of <51> audio stream set point, it can change to the next audio stream of the audio stream set up now, or the audio stream in front of one. Then, the content of the changed audio stream is reproduced.

[0330] If a ten key is pushed during the screen display of <52> audio stream set point, it can change to the audio stream of the number which carried out the ten key input. Then, the content of the changed audio stream is reproduced.

[0331] If a clear key is pushed during the screen display of <53> audio stream set point, the set point

display of an audio stream is eliminable from a screen.

[0332] \*\*\*\* of [audio key (AUDIO) 5aud -- the case under the 2; halt (under a blue back screen display) --]

If an audio key is pressed during <54> halt, the language name of the audio stream set as the title chosen now will be indicated by predetermined time (for example, 3 seconds) on a blue back screen using a character generator (when the classification of an audio stream is language). (after investigating the audio stream information recorded on the disk) If an audio key is further pressed during this display, the following audio stream number will be set up. If this audio key stroke is repeated, the audio stream voice currently recorded on that title will be set up and displayed cyclically one by one.

[0333] If said selection key / cursor key 5q are pushed during the blue back screen display of <55> audio stream set point, it will change to the next audio stream of the audio stream by which current setting out is carried out, or the audio stream in front of one.

[0334] If a ten key is pushed during the blue back screen display of <56> audio stream set point, it will change to the audio stream of the number which carried out the ten key input.

[0335] If a clear key is pushed during the blue back screen display of <57> audio stream set point, the set point display of an audio stream will be eliminated from a screen.

[0336] \*\*\*\* of [subtitle key (SUBTITLE) 5sbt -- the case under the 1; playback --]

If it pushes during <58> playbacks, the language name of the subimage stream under present playback will be indicated by predetermined time (for example, 3 seconds) on a playback screen using a character generator (OSD). (after investigating the subimage stream information recorded on the disk) (when the classification of a subimage stream is language) If a subtitle key is further pressed during this display, the subimage of the following stream number will come to be reproduced. If this subtitle key stroke is repeated, the subimage stream currently recorded on that title will be reproduced cyclically one by one.

[0337] By pushing said selection key / cursor key 5q during the screen display of <59> secondary image stream set point, it can change to the next subimage stream of the subimage stream set up now, or the subimage stream in front of one. Then, the content of the changed subimage stream is reproduced.

[0338] If a ten key is pushed during the screen display of <60> secondary image stream set point, it can change to the subimage stream of the number which carried out the ten key input. Then, the content of the changed subimage stream is reproduced.

[0339] If a clear key is pushed during the screen display of <61> secondary image stream set point, the set point display of a subimage stream is eliminable from a screen.

[0340] \*\*\*\* of [subtitle key (SUBTITLE) 5sbt -- the case under the 2; halt (under a blue back screen display) --]

If a subtitle key is pressed during <62> halt, the language name of the subimage stream set as the title chosen now will be indicated by predetermined time (for example, 3 seconds) on a blue back screen using a character generator (when the classification of a subimage stream is language). (after investigating the subimage stream information recorded on the disk) If a subtitle key is further pressed during this display, the following subimage stream number will be set up. If this subtitle key stroke is repeated, the subimage stream voice currently recorded on that title will be set up and displayed cyclically one by one.

[0341] If said selection key / cursor key 5q are pushed during the blue back screen display of <63> secondary image stream set point, it will change to the next subimage stream of the subimage stream by which current setting out is carried out, or the subimage stream in front of one.

[0342] If a ten key is pushed during the blue back screen display of <64> secondary image stream set point, it will change to the subimage stream of the number which carried out the ten key input.

[0343] If a clear key is pushed during the blue back screen display of <65> secondary image stream set point, the set point display of a subimage stream will be eliminated from a screen.

[0344] [The function of subtitle-on off key (SUBTITLE ON/OFF) 5v]

The display of <66> secondary image (subtitle) is turned on and off.

[0345] When the subtitle-on off key was pressed into <67> video recovery and subgraphic display (subgraphic display ON established state), while the subimage stream number set point was turned off, after a predetermined time (for example, 3 seconds) indication (OSD) of the set point is given with a character generator, a subimage is eliminated from a screen.

[0346] When the subimage was not but displayed during <68> video recovery (subgraphic display OFF

established state) and the subtitle-on-off key was pressed, while the subimage stream number set point was turned on, after a predetermined time (for example, 3 seconds) indication of the set point is given with a character generator, the subimage of the language of the turned-on setting-out stream number is reproduced (when the subimage is recorded on the disk under playback).

[0347] When a subtitle-on off key is pressed during <69> video-recovery halt, only on-off setting out of subgraphic display can be performed.

[0348] When the force rendering command is included in the subimage stream of the same linguistic code as the audio stream currently reproduced, the subimage corresponding to this command is surely reproduced, it comes out to a screen and it is made to draw in <70> secondary graphic display off established state.

[0349] [The function of angle-type key (ANGLE) 5ang]

The title with the angle iron which consists of <71> multi-angle-type information is chosen, and if it pushes when this angle iron (angle-type section) is reproduced, a predetermined time (for example, 5 seconds) indication of the angle-type number under present playback will be given by the character generator (OSD). If an angle-type key is pressed once again during this angle-type number display period, the same time-of-day point of the cel of the following angle-type number will be searched, and playback will be started from there.

[0350] for example, a certain batter's home run scene is reproduced by the angle-type number 1 (camera angle which looks at a pitcher's back from a pin center, large side) of multi-angle iron -- having -- \*\*\*\* - - after [ of the playback start time of the angle iron cel ] 5 seconds -- a vat -- a ball -- hitting accurately -- further -- suppose that a hit ball is pierced in the right stand after 3 seconds. If the user who thought wanted to see this home run scene by another camera angle presses an angle-type key and pushes the angle-type number 2, the playback start time point of that angle iron cel will be searched, and playback of the home run scene in an angle type 2 (for example, camera angle which looks at the whole gland from first base Uchino stand side) will come to be resumed from there.

[0351] If an angle-type key is further pressed during the above-mentioned angle-type number display period, the angle-type number currently recorded will change cyclically one by one, and playback of the angle type after selection will be resumed.

[0352] When a screen display of the angle-type number is carried out with <72> character generators, a desired angle-type number can also be direct chosen by ten key actuation (when the ten key input of the angle-type number which does not exist in the angle iron under playback is carried out, the key input is an invalid). Or you can also make it go up and down an angle-type number by said selection key / cursor key 5q.

[0353] Also when an angle-type change is performed during still picture playback within the cel of <73> multi-angle iron, a search is performed at the same playback event and the still picture of searched another angle type is reproduced.

[0354] For example, suppose that the still picture of a certain automobile was reproduced by the angle-type number 1 (camera angle seen from a transverse plane). If the user who thought wanted to see this automobile by another camera angle presses an angle-type key and pushes the angle-type number 2, the playback start time point of the angle iron cel of the angle-type number 2 will be searched, and the still picture in an angle type 2 (for example, camera angle seen from a right lateral) will be reproduced from there.

[0355] If an angle-type key is further pressed during the above-mentioned angle-type number display period, the angle-type number currently recorded will change cyclically one by one, and the still picture of the angle type after selection will be reproduced.

[0356] Even if it performs an angle-type key stroke during the cel playback of those other than <74> multi-angle iron, it can avoid receiving angle-type setting out (angle-type number change). Angle-type setting out (angle-type number change) is restricted and received when a multi-angle iron cel exists in the title under playback.

[0357] <75> When a multi-angle iron cel exists in the selected title, even if it is under halt, angle-type setting out (angle-type number change) can be received.

[0358] [-- rapid-traverse (FWD) key/-- already -- returning (REV) -- function] of key (duplex Mark Misumi of left sense and right sense) 5j

under <76> animation playback or still picture playback -- a rapid-traverse key -- or -- already -- return



key press \*\* -- usually -- the time of playback -- early (for example, usually twice [ about ] at the time of playback) -- a rapid traverse -- or return playback is already performed. (By the animation, a motion becomes \*\*\*\* and the coma delivery change period is shortened in one half in a still picture.) if it continues pushing further -- usually -- the time of playback -- further -- early (for example, usually about 8 times at the time of playback) -- a rapid traverse -- or return playback is already performed. (By the animation, a motion becomes 8X and the coma delivery display change period is shortened to one eighth in a still picture.)

In addition, in the repeat display of the main image video a rapid traverse and in already return, the I picture +P picture of MPEG is reproduced, and it can constitute from many \*\*\*\* beyond it at 2X so that I picture may be reproduced.

[0359] About voice playback, it can be performed as follows in that case. That is, in the case of 2X playback, voice data is decoded with a twice as many clock as usually playback, and 2X voice data is decoded. Moreover, in many \*\*\*\*, voice decoding at the time of many \*\*\*\* is performed by usually reproducing selectively the voice data of the point jumped (from a certain I picture to the following I picture) by playback.

[0360] if <77> playback key is pressed -- rapid-traverse playback -- or return playback is canceled and usually already returns to playback of a rate.

[0361] The <78> above-mentioned rapid-traverse key, a rapid traverse already according to a return key, or when return playback carries out the key stroke, it is already performed only within the program chain under playback. After being fast forwarded to the last of the program chain or already making return to the head of the program chain, it will be in a halt condition there.

[0362] the <79> above-mentioned rapid-traverse key or a rapid traverse already according to a return key -- or playback of voice (audio stream) and a subtitle (subimage stream) can already be automatically forbidden during return playback.

[0363] In addition, you may make it reproduce, changing a playback pitch about voice corresponding to fast traverse. the time of an animation being a documentary film of a marathon game for example, and the subtitle being used for the display of the time amount progress from a game start -- a rapid traverse -- or you may make it already reproduce a subtitle at the time of return playback

[0364] the <80> above-mentioned rapid-traverse key, a rapid traverse already according to a return key, or the case where a cel playback mode already becomes a still during return playback -- a rapid traverse -- or return actuation is canceled and already starts still picture playback. When the cel playback mode is a still, by pressing a rapid-traverse key (or already return key), continuation coma delivery (or continuation coma return) actuation can be started at the change rate of about 1 screen, for example per second. If it continues pressing further a rapid-traverse key (or already return key) at this time, continuation coma delivery (or continuation coma return) actuation can be started, for example at the rate of about 4 screens / second. If it pushes further once again, it can return to continuation coma delivery (or continuation coma return) actuation of the rate of about 1 screen / second. this continuation coma delivery (or continuation coma return) -- if it separates from a cel playback mode working, about 2X rapid-traverse (or already return) playback can be performed.

[0365] the above "a case [ the cel playback mode became a still ]" -- the still (VOBU still) of the video object unit unit of drawing 14 -- it will become a still, if it becomes and the above-mentioned rapid-traverse key (or already return key) will be pressed, the next VOB (or before) is reproduced and playback of the VOB is completed. However, if the above-mentioned rapid-traverse key (or already return key) is further pressed during VOB playback, the VOB is fast forwarded (or already return), and it will become a VOB still after that and will stop.

[0366] [The function of display key (DISPLAY) 5u]

If this key is pressed during <81> halt or playback, the display corresponding to the various contents of a key stroke at that time will be performed (on the screen of the display 48 of the body of equipment, and/or the monitor section 6).

[0367] [A ten key ([0] - [9] & [+10]) 5t function]

<82> It can usually be used for assignment of the chapter number in the present playback title during playback. The search actuation to the chapter of the number simultaneously specified as ten key input decision (said definite key stroke) is started (this search can be enabled by the title number key T mentioned later). The chapter number not existing is not received.



[0368] It can be used for assignment of the chapter number in the title chosen during <83> halt. The search actuation to the chapter of the number specified as ten key input decision and coincidence is started (this search is possible by the title number key T). The chapter number not existing is not received.

[0369] When the title containing <84> multi-angle iron is under playback (under angle-type cel playback) and it is [ angle-type number ] under display, the angle-type number by which the ten key input was carried out is chosen direct. However, the input of the angle-type number not existing is not received.

[0370] When the number is given to the item in each disk menu screen during <85> disk menu display, the item corresponding to the number which carried out the ten key input is chosen and performed. However, the input of the item number not existing is not received.

[0371] When setting up a parental lock from <86> setup menu, a ten key can be used for the input of a personal identification number.

[0372] [The function of clear-key (CLEAR) 5cr]

It is used for cancellation of a key input of <87> title number or a chapter number.

[0373] It is used for cancellation of the personal identification number input for <88> parental level change.

[0374] <89> It is used for discharge in the repeat mode mentioned later.

[0375] <90> It is used for cancellation of the input number at the time of the storage configuration menu manipulation mentioned later.

[0376] <91> It is used for the discharge of a memory playback mode mentioned later.

[0377] <92> It is used for the discharge of a random playback mode mentioned later.

[0378] It is used for cancellation of a number display of <93> titles, voice (audio stream), a subtitle (subimage stream), and each angle type.

[0379] [The function of repeat key (REPEAT) 5k]

It uses for repeat setting out of <94> chapters or a title (however, only in case of title of 1 sequence-program-control-method chain).

[0380] <95> Whenever it presses this key, as it was called "chapter repeat" -> "title repeat" -> "repeat-off" -> "a chapter repeat", repeat mode is changed cyclically one by one.

[0381] <96> If a repeat key is pushed during the A-B repeat actuation mentioned later, A-B repeat actuation is canceled and it can move to a chapter repeat.

[0382] <97> rapid-traverse key -- repeat actuation will be canceled if it already separates from the repeat section by actuation of a return key or a skip key.

[0383] When multi-angle iron is within <98> repeat sections, an angle-type change presupposes that it is possible (said angle-type key functions also within repeat mode).

[0384] [The function of A-B repeat key (A-B REPEAT) 5k]

It uses for setting up the starting point and the terminal point of repeat actuation for <99> 2 points (however, only in case of title of 1 sequence-program-control-method chain).

[0385] <100> The starting point (A) is set as the 1st time by pressing this key, and a terminal point (B) is set up by pushing on the 2nd time. The starting point set as the terminal completion of setting out and coincidence is searched, and between A-B is reproduced repeatedly henceforth.

[0386] The repeat between <101> A-B can be canceled by said clear-key actuation.

[0387] When changed into titles other than between A-B, or playback of a chapter during <102> A-B repeat actuation, or when said repeat key is pushed, the repeat between A-B can be canceled.

[0388] a <103> rapid-traverse key -- if it already separates from the A-B repeat section by actuation of a return key or a skip key, A-B repeat actuation will be canceled.

[0389] A-B repeat actuation can be canceled before setting out of <104> repeat terminal points (B) a clear key, a rapid-traverse key, and by already pushing a return key or a skip key.

[0390] When a title is completed before reaching during <105> A-B repeat playback at a terminal point (B), A-B repeat actuation is canceled.

[0391] Within the <106> multi-angle iron section, setting out of the starting point (A) of the repeat between A-B can be repealed. (The head of the multi-angle iron section can be made into the starting point of the repeat between A-B.) For example, the camera angle scene of the angle-type number 1 of a certain multi-angle iron can be made to repeat between A-B in the proposal bull block.

When multi-angle iron comes during <107> A-B repeat playback, A-B repeat actuation can be canceled.

[0392] The starting point (A) and the terminal point (B) which were set up by the repeat key between <108> A-B come to point out the head (start address) of image data (GRU PUOB picture) where it corresponds immediately after setting out.

[0393] [A memory key (MEMORY) 5m function]

When <109> trays are closed and the disk is set, pressing this key and a storage configuration screen are displayed (OSD). When this key is pressed during a storage configuration screen display, it returns to the condition before a storage configuration screen display.

[0394] The <110> storage-configuration approach is performed by carrying out the sequential input of the number of the title memory playback is carried out [ title ], and a chapter by said ten key and the title number (T) key mentioned later, and going during a storage configuration screen display.

[0395] <111> If the cursor in the display screen is moved by said selection key / cursor key and the above-mentioned storage configuration input is performed by the memory number of a cursor location, every one title chapter number set up by the memory number after the memory number will shift to a back memory number.

[0396] For example, "title 1 and the chapter 3" and the "title 2 and a chapter 1" are already set up by the memory number 1 and the memory number 2, and suppose that he had no setting out after the memory number 3. Supposing it doubles cursor with the memory number 1 here and sets up "title 2 and a chapter 5", the content set as the memory number 1 and the memory number 2 till then will be shifted to the memory number 2 and the memory number 3. Consequently, the content of setting out of the memory numbers 1, 2, and 3 serves as "title 2 and a chapter 5", the "title 1 and a chapter 3", and the "title 2 and a chapter 1", respectively.

[0397] <112> If the cursor in the display screen is moved by said selection key / cursor key and said clear-key actuation is performed by the memory number of a cursor location, the content set up by the memory number will be cleared, and the content set up by the memory number after the memory number will advance to the memory number in front of one.

[0398] For example, "title 2 and the chapter 5", the "title 1 and a chapter 3", and the "title 2 and a chapter 1" are set as the memory number 1, the memory number 2, and the memory number 3, respectively, and suppose that he had no setting out after the memory number 4. If cursor is doubled with the memory number 2 here and clear-key actuation is performed, the content "title 1 and a chapter 3" set as the memory number 2 till then will be cleared, the content set as the memory number 3 till then will shift to the memory number 2, and the content (setting [ no ] up) set as the memory number 4 till then will shift to the memory number 3. Consequently, the content of setting out of the memory numbers 1, 2, and 3 is "title 2 and a chapter 5", the "title 2 and a chapter 1", and "no setting up" up, respectively.

[0399] In addition, although there is not necessarily no necessity which imposes a limit on the number of storage configurations (upper limit of a memory number), the maximum number of a storage configuration is chosen about as 30 from the problem of the physical memory space by the side of the need in actual software, and equipment. (Though 99 titles is recorded on the disk of one sheet, speaking as a general user, the maximum number of a storage configuration is not necessarily needed 99.) The demand which carries out a storage configuration to two or more chapters in each title of 99 with business-use equipment on the other hand may come out, and it is good as for 99 or more in the maximum number of a storage configuration in that case.

If said playback key is pressed during a <113> storage-configuration screen display, memory playback will be started in the sequence which carried out storage configuration registration.

[0400] For example, if "title 2 and the chapter 5", the "title 1 and a chapter 3", and the "title 2 and a chapter 1" are set up by the memory number 1, the memory number 2, and the memory number 3, respectively, it was not set as them after the memory number 4 and a playback key is pushed on them during a storage configuration screen display in the condition, memory playback will be performed as follows. That is, "title 2 and a chapter 5" are reproduced first, then "title 1 and a chapter 3" are reproduced, and, finally "title 2 and a chapter 1" are reproduced. After playback of "title 2 and a chapter 1" is completed, playback stops.

[0401] A memory playback mode can be canceled and it can be made to usually shift to playback as it is by pushing said clear key during <114> memory playback.

[0402] The content set up on <115> storage configuration screens is clearable by the following approaches.

[0403] (b) Eliminate all the title numbers and chapter numbers set up during a storage configuration screen display by the clear key.

[0404] (b) When the tray was opened and a disk is discharged out of equipment. (However, with business-use equipment, even if it prepares a non-volatile internal memory in the interior of equipment and discharges a disk, the storage configuration may be saved with the code which specifies the disk.)  
[The function of random key (RANDOM) 5rm]

<116> When the title chosen is 1 sequence-program-control-method chain, random playback of the chapter within the title is performed.

[0405] If this key is pressed during <117> playbacks, random playback will be started from the next chapter of the chapter which is carrying out current playback. (For example, if a random key is pressed while reproducing the chapter 2 of the title containing chapters 1-9, when starting playback of a chapter 3, it will become random playback, for example, each chapter will be reproduced at random like chapters 5, 3, 7, 1, and 9.)

[0406] If this key is pressed during <118> halt, when said playback key is pressed next and disk playback is begun, random playback will be started from from.

[0407] <119> It becomes a playback halt after random playback of all the chapters in the title chosen is completed. Duplication playback of the usually same chapter number is not performed during this random playback, but only suppose that it is to randomize playback sequence to the last. However, unless it is good also as possible, and a power source is turned off in the random playback including duplication playback or a stop key is pushed, you may make it repeat random playback by the endless loop.

[0408] A memory playback mode can be canceled and it can be made to usually shift to playback as it is by pushing said clear key during <120> random playback.

[0409] If a random key is pressed during <121> random playback, a random playback mode will be canceled.

[0410] [The function of slow key (SLOW) 5sw]

If a slow key is pressed during <122> playbacks, it will become slow playback of for example, 1/2 speed in the forward direction, and the figure, notation, etc. corresponding to "1/2" or this will be simultaneously displayed on the video image under playback using a character generator.

[0411] <123> If this key is pressed continuously, it will become slow playback of for example, 1/8 speed in the forward direction. If it furthermore pushes, slow reproduction speed will be periodically switched like 1/16 ->1/8 ->1/2 ->1/8 ->1/16 --, and the slow display on the video image under playback will also correspond and change.

[0412] If a slow key is pressed while <124> playback actuation stops (based on said halt key stroke), it will become 1 / 16 slow-speed playback, for example. How whose subsequent slow key is effective is the same as the above.

[0413] If said playback key is pressed during <125> slow playback, it will usually move to playback.

[0414] When a title change is made during <126> slow playback, a slow playback mode is canceled and it usually moves from it to playback.

[0415] Let a slow key stroke be an invalid during still playback by the <127> cel playback mode.

[0416] During <128> slow playback, although voice is not usually reproduced, according to reproduction speed, the pitch of audio data may be changed and you may reproduce.

[0417] [The function of last play key (LAST PLAY) 5tp]

If this last play key is pressed after playback is interrupted more (interruption to service is included) off [ said stop key or a power-source key ] during <129> disk playback, playback will be started from a front location for a while from the interrupted location or interruption location.

[0418] When the disk tray after <130> halt is opened, the memory of a playback interruption location is cleared and a last play key is made to an invalid. If memory of a playback interruption location is not cleared but being saved in the memory in equipment, also after taking a disk in and out of a tray, playback can be resumed from a front location for a while from the location or interruption location interrupted by pressing a last play key.

[0419] <131> -- the case where a first play program chain (auto start) exists in that disk -- setting -- a

power source -- when playback is interrupted more off, let this last play key be an invalid. (That is, playback begins from a first play program chain.)

[0420] If the loop count of random playback is memorized inside equipment when playback interruption is carried out during playback of a <132> random program chain, playback can be resumed from a front location for a while from the location or interruption location interrupted by pressing a last play key.

[0421] [The function of setup key (SETUP) 5y]

Suppose that it is effective only during a playback halt by the key which calls the setup menu for performing various setting out (setting out of a screen size/aspect ratio, setting out of an angle mark, setting out of a parental lock, setting out of a desired spoken language class, setting out of a desired title language class, setting out of a desired menu language class, setting out in auto angle-type mode, etc.) of <133> equipment.

[0422] If this setup key is pressed during a <134> setup menu display, the display of a setup menu will be turned off and it will be in a playback idle state (blue back screen).

[0423] [The function of title number (key T) 5tt]

After setting up the figure by which the ten key input was carried out as a title number and pressing this key before pressing this key at the time of assignment of the title number and chapter number for performing <135> search actuation or memory playback actuation, the figure by which the ten key input was carried out is set up as a chapter number.

[0424] <136> If this title number key is pressed before pressing said random key, it will become the random playback of a title instead of random playback of a chapter. For example, titles 1, 2, 3, 4, and 5 are recorded on the disk set to the tray, and random playback of a title unit will be started in order of titles 2, 5, 1, 4, and 3 (if a random key is pressed after pushing a title number key, for example, if it is [ be / it ] under halt and a playback key is pressed further).

[0425] [The function of remote controller change key 5x]

It is used when changing the remote controller 5 of <137> drawing 33 to actuation of devices other than the DVD videocassette recorder of drawing 31 (for example, AV television and VCR). Or when one set of one set of a DVD video playr and a DVD videocassette recorder is installed simultaneously and it operates a DVD video playr and a DVD videocassette recorder according to an individual as at least one remote controller 5 is, it can use remote controller change key 5x for the actuation change.

[0426] Although the functions of the key explained above are a DVD video playr (playback special-purpose machine) and a common function, the remote controller 5 for DVD videocassette recorders is equipped with the key which has the following functions further.

[0427] [The function of image transcription mode key 5rmd]

whenever [ which will be once pushed if this key is pressed into a <138> image-transcription halt or an image transcription pause ] -- MPEG 2/8Mbps->MPEG 2/6Mbps->MPEG 2/4Mbps->MPEG 2/2 Mbps->MPEG1/2 Mbps->MPEG1/1Mbps-> automatic image quality mode ->MPEG 2 / 8Mbps-> ..... and \*\* -- image transcription mode changes cyclically like.

[0428] Although image transcription time amount becomes short if the quality of the broadcast studio average of NTSC is hope, MPEG 2/8Mbps is chosen. MPEG 2/6Mbps, or MPEG 2/4Mbps is chosen to extend image transcription time amount to a slight degree, and acquire the image quality more than the canonical mode of S-VHS video. MPEG 2/2Mbps is chosen to extend image transcription time amount furthermore and acquire the image quality more than the 3 time mode of S-VHS video. Usually, if the image quality of VHS (or video CD) extent is sufficient and MPEG1/2Mbps, or MPEG1/1Mbps will be chosen, image transcription time amount can be extended further.

[0429] [The function of image transcription key 5rec]

An image transcription will be started, if it is pushed when an availability is in the DVD-RW disk (or DVD-R disk) 10 set to the body of <139> drawing 32 and initialization for an image transcription (distinction of MPEG 2 / MPEG1, setting out of the average bit rate of record, etc.) has ended.

[0430] In addition, when an image transcription key is pressed without a user's performing this initial setting, default setting is automatically adopted as this initial setting, and an image transcription is started.

[0431] [The function of display-mode key 5dm]

Time of the :(1) image-transcription source (TV channel number or number of AV input) + present from which an OSD display (or display 48 of the body of equipment) changes from the following contents

whenever it will be push once, if this key is press where the DVD-RW disk (or DVD-R disk) 10 in which <140> image transcriptions are possible is set to the body 200 of drawing 32 ;

(2) current title set number, recorded on videotape time amount, and recordable residual time + -- average record rate [ at that time ];

(3) a display -- off -- the above (1) and (2) may be displayed simultaneously.

[0432] [The function of OSD key 5osd]

If this key is pressed while outputting alphabetic character (or image) data for MPU30 of <141> drawing 31 to indicate by OSD, OSD displaying [ which a user does not wish ] will be eliminated from a monitor screen. If this key is pressed once again, the OSD data which MPU30 is outputting will be displayed on a monitor screen.

[0433] [The function of timer key 5tme]

<142> When this key is pressed, MPU30 of drawing 31 is made to output to the screen of the monitor which does not illustrate the menu (the table which specifies the channel wishing an image transcription, image transcription reservation time, image transcription mode, an average record rate, etc. for every reservation program is included) of timer reservation (OSD). Program reservation setting out in this menu can be performed using cursor key 5q, ten key 5t, enter key 5s, etc.

[0434] If this timer key 5tme and image transcription key 5rec are simultaneously pushed where the DVD-RW disk (or DVD-R disk) 10 which can be recorded on videotape is set to the body 200 of drawing 32 after actuation of <143> timer reservation is made, the DVD videocassette recorder of drawing 31 will go into timed recording mode (timer image transcription standby condition).

[0435] Next, a representation frame is explained.

[0436] The video data which constitutes two or more chapters (the 1st and 2nd --, the n-th chapter) is contained in the video object DA 22 of an optical disk 10. Two or more image data equivalent to two or more frames is contained in this video data. Moreover, the representation frame representing each chapter is contained in two or more frames. This representation frame is a frame set from the reason mentioned later as the object of a cutback. Moreover, this representation frame is also a frame used as the object for printing. The image data equivalent to this representation frame is representation image data indicated previously. That is, the information which shows the storing location of this representation image data is the head address data INFO11 and the length data INFO12.

[0437] Next, the relation between a main frame and a subframe is explained.

[0438] The video data contained in the video object DA 22 of an optical disk 10 is data compressed by the compression method defined by MPEG 2. The radical image data equivalent to the radical image (I picture: Intra-Picture) which becomes a radical, and the changed data in which a changed part (motion) of this radical image is shown are contained in such a video data. A main frame is formed of the radical image data contained in a video data, and a subframe is formed with changed data. A subframe is an image following a mainframe. That is, the sequence reproduced serves as the Maine image data (radical image data) equivalent to a main frame, and sub image data equivalent to a subframe. With the gestalt of this operation, a representation frame shall be equivalent to a mainframe, for example. That is, the information which shows the storing location of the Maine image data equivalent to a main frame serves as the head address data INFO11 and the length data INFO12.

[0439] Next, a skip regenerative function is explained.

[0440] The function (skip regenerative function) which reproduces a video data from a position (predetermined chapter) is prepared in the digital information record regeneration system. In order to realize this skip regenerative function, the menu screen information for creating a skip playback menu screen is recorded on the picture object DA 23 of an optical disk 10. If directions of a menu display are received through menu screen key 5n of a remote controller 5, a digital information record regeneration system will read menu screen information in an optical disk 10, and will display a skip playback menu screen on output unit (monitor etc.) 46a based on this menu screen information.

[0441] The 1st representation frame representing the 1st chapter, the 2nd representation frame representing the 2nd chapter, --, the n-th representation frame representing the n-th chapter are displayed on a skip playback menu screen. That is, in case a digital information record regeneration system displays a skip playback menu screen, it reads the head address data INFO11 and the length data INFO12, and reads representation image data from the storing location of representation image data. Furthermore, this representation image data is reduced and the representation frame of each chapter is

displayed on a skip playback menu screen. If a digital information record regeneration system receives assignment of a predetermined representation frame through the selection key / cursor key 5q of a remote controller 5 at this time, playback of the video data from the chapter equivalent to this predetermined representation frame will be started. Thus, a skip regenerative function is realized. [0442] Next, printing processing of the information about the content of record of an optical disk 10 is explained.

[0443] In this invention, the information about the content of record of an optical disk 10 is printed by the front face of an optical disk 10, the cartridge which holds an optical disk 10, or the label attached to an optical disk 10. Thereby, the information about the content of record of an optical disk 10 can be told, without playing an optical disk 10. The representation image data equivalent to a representation frame (the frame for printing, main frame) corresponds to the information about the content of record of an optical disk 10. Moreover, image information INFO7 (the image transcription time information INFO71, the image transcription channel information INFO72, the white balance information INFO73, the zoom scale-factor information INFO74, the shutter speed information INFO75, GPS information INFO76) also corresponds to the information about the content of record of this optical disk 10. Furthermore, the capacity information 271 (the whole capacity information 2711, availability information 2712) and the count information 701 of rewriting also correspond to the information about the content of record of this optical disk 10.

[0444] Here, with reference to the flow chart of drawing 34, printing of the information about the content of record of an optical disk 10 is explained.

[0445] The function (record related-matters print facility) which prints the information about the content of record of an optical disk 10 is prepared in the digital information record regeneration system. In order to realize this record related-matters print facility, the menu screen information for creating a printing menu screen is recorded on the volume file management information 70 on an optical disk 10. If directions of record related-matters printing are received through print key 5pri of a remote controller 5 (ST1, YES), a digital information record regeneration system will read menu screen information in an optical disk 10, and will display a printing menu screen on output unit 46a based on this menu screen information (ST2).

[0446] The object for printing is displayed on a printing menu screen. That is, a representation frame (the 1st and 2nd --, n-th representation frame), image information INFO7 (the image transcription time information INFO71, the image transcription channel information INFO72, the white balance information INFO73, the zoom scale-factor information INFO74, the shutter speed information INFO75, GPS information INFO76), the capacity information 271 (the whole capacity information 2711, availability information 2712), the count information 701 of rewriting, etc. are displayed on a printing menu screen. That is, in case a digital information record regeneration system displays a printing menu screen, it reads the head address data INFO11 and the length data INFO12, and reads representation image data from the storing location of representation image data. And this representation image data is reduced and the representation frame of each chapter is displayed on a printing menu screen. Furthermore, in case a digital information record regeneration system displays a printing menu screen, it reads image information INFO7 (the image transcription time information INFO71, the image transcription channel information INFO72, the white balance information INFO73, the zoom scale-factor information INFO74, the shutter speed information INFO75, GPS information INFO76), the capacity information 271 (the whole capacity information 2711, availability information 2712), and the count information 701 of rewriting. and these reading \*\*\*\* information is displayed on a printing menu screen.

[0447] A digital information record regeneration system will order the printing section to print the specified object for printing, if a printing menu screen receives assignment for printing through a control panel in the phase displayed on output unit 46a (ST3, YES). According to this instruction, the printing section performs image formation processing based on the data for [ which was specified ] printing. That is, a printing place in case [ this (ST4) ] the printing section prints the specified object for printing to a predetermined printing place is the front face of an optical disk 10, the cartridge which holds an optical disk 10, or a label attached to an optical disk 10.

[0448] Drawing 35 - drawing 37 are drawings showing signs that the printing matter was printed on a label.

[0449] Drawing 35 is drawing showing signs that image information INFO7 (the image transcription time information INFO71, the image transcription channel information INFO72, the white balance information INFO73, the zoom scale-factor information INFO74, the shutter speed information INFO75, GPS information INFO76) was printed on the label attached to an optical disk 10 and a cartridge 11.

[0450] Drawing 36 is drawing showing signs that the capacity information 271 (the whole capacity information 2711, availability information 2712) was printed on the label attached to a cartridge 11.

Drawing 36 (a) is drawing showing a situation by which the capacity information 271 (availability) was shown numerically. Drawing 36 (b) is drawing showing a situation by which the capacity information 271 (the remaining image transcription time amount) was shown numerically. Image transcription time amount changes according to the compressibility of the image data recorded on an optical disk 10. Therefore, the exact remaining image transcription time amount cannot be known from an availability. Here, the near remaining image transcription time amount shall be printed. Drawing 36 (c) is drawing showing a situation by which the capacity information 271 (availability) was shown with the picture. If they are shown by comparison by the capacity currently used and intact capacity as shown in drawing 36 (c), a user can catch storage capacity visually.

[0451] Drawing 37 is drawing showing signs that the count information 701 of rewriting was printed on the label attached to an optical disk 10. It is assumed by optical disk like DVD-RAM that rewriting of data is performed frequently. However, if the count of rewriting is limited and a certain count is exceeded, the field which cannot be written in will produce it. If the field which cannot be written in increases too much, it becomes impossible for the chart lasting time of data to do by the permutation, and it becomes impossible to record data, although the field which cannot be written in is permuted. In order to tell a user about them in advance, the count of rewriting is printed. Drawing 37 (a) is drawing showing a situation by which the count information 701 of rewriting was shown numerically. Drawing 37 (b) is drawing showing a situation by which the count information 701 of rewriting was shown with the picture.

[0452]

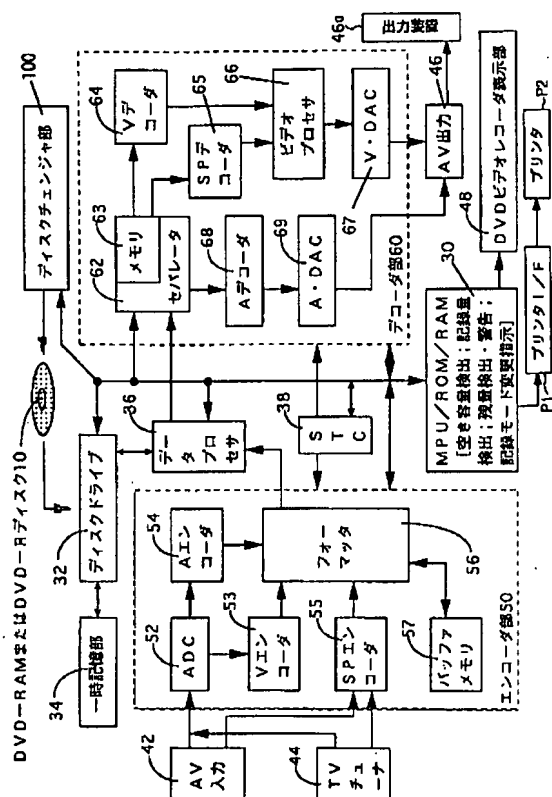
[Effect of the Invention] According to this invention, the information record-medium processor which can display the information about the content of record of an information record medium easily can be offered, without needing playback and the troublesome time and effort of an information record medium (optical disk).

[0453] Moreover, according to this invention, the information record medium which can be contributed to achievement of the object [ without needing playback and the troublesome time and effort of an information record medium ] of displaying the information about the content of record of an information record medium easily can be offered.

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[Translation done.]

Drawing selection **Representative drawing** 



[Translation done.]